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IN REPLY REFER TO: Joint Interoperability Test Command (JTE) **21 Jan 09**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of Avaya S8300/G350 Release Communication Manager (CM) 4.0 (R14x.00.2.732.1) with Service Pack 16538

References: (a) DoD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008
(c) through (f), see Enclosure 1

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification.

2. The Avaya S8300 Release CM 4.0 (R14x.00.2.732.1) with Service Pack 16538 is hereinafter referred to as the system under test (SUT). The SUT meets all of the critical interoperability requirements and is certified for joint use within the Defense Switched Network (DSN) for the following switch types: Private Branch Exchange (PBX) 1 and PBX 2. The SUT meets the Voice over Internet Protocol critical interoperability requirements with any certified Assured Services Local Area Network (ASLAN) on the Unified Capabilities (UC) Approved Products List (APL). The identified test discrepancies shown in the Certification Testing Summary (Enclosure 2) have an overall minor operational impact. No other configurations, features, or functions, except those cited within this report, are certified by the JITC, or authorized by the Program Management Office for use within the DSN. This certification expires upon changes that could affect interoperability, but no later than four years from the date of this memorandum.

The S8300 media servers work in conjunction with the G350 complementary media gateways which support multi-protocol environments for concurrent support of Time Division Multiplex (TDM) and Internet Protocol (IP)-based telephony. The SUT can support more than one G350 gateway; however, due to timing issues noted during testing, the SUT is certified with only one G350.

3. This finding is based on interoperability testing conducted by JITC, review of the vendor's Letters of Compliance (LoC), and Defense Information System Network (DISN) Security Accreditation Working Group (DSAWG) accreditation. Interoperability testing of the SUT was conducted at JITC's Global Information Grid Network Test Facility at Fort Huachuca, Arizona, from 18 August through 3 October 2008. Review of vendor's LoC was completed on

21 October 2008. Regression Testing was conducted from 10 through 18 November 2008. DSAWG grants accreditation based on the security testing completed by DISA-led Information Assurance test teams and published in a separate report (reference (c)). DSAWG accreditation was granted on 13 January 2009. Enclosure 2 documents the test results and describes the tested network and system configurations.

4. The interoperability test summary of the SUT is indicated in Table 1. The PBX 1 Capability Requirements (CRs) and Feature Requirements (FRs) are listed in Table 2. This interoperability test status is based on the PBX 1's ability to meet:

a. DSN services for Network and Applications specified in reference (d).

b. PBX 1 interface and signaling requirements for trunks/lines specified in reference (e) verified through JITC testing and/or vendor submission of LoC.

c. PBX 1 CRs/FRs specified in reference (e) verified through JITC testing and/or vendor submission of LoC.

d. The overall system interoperability performance derived from test procedures listed in reference (f).

Table 1. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all critical CRs and FRs with the following minor exception: Wink start recognition is not within the required tolerance.[1]
E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs with the following minor exception: Wink start recognition is not within the required tolerance.[1]
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested	This interface is not supported by the SUT. This is not a required interface for a PBX 1. There is no risk associated with the SUT not supporting this feature.
DSN Line Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs with the following minor exception: Precedence ring cadence not in accordance with UCR requirement.[2]
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Met all critical CRs and FRs with the following minor exception: Precedence ring cadence not in accordance with UCR requirement.[2]
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs with the following minor exception: Precedence ring cadence not in accordance with UCR requirement.[2]
VoIP	No	Certified	Met all critical CRs and FRs with the following minor exception: Precedence ring cadence not in accordance with UCR requirement.[2]
DSN Features and Capabilities			
Features and Capabilities	**Critical**	**Status**	**Remarks**
Common Features	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The call pick-up feature does not pick-up the call with the highest precedence or longest ringing call first.[3] Three-way conference members do not maintain their assigned precedence levels.[4]
Attendant	No	Not Tested	This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.

Table 1. SUT Interoperability Test Summary (continued)

DSN Features and Capabilities (continued)			
Features and Capabilities	**Critical**	**Status**	**Remarks**
Public Safety	Yes	Certified	The SUT met all critical CRs and FRs for Basic 911. Additionally the SUT met the following non-critical CRs and FRs: Tracing of a Terminating Call, Outgoing Call Tracing, and Trace of a Call in Progress.
Preset Conferencing	No	Not Tested	This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.
Meet-me Conferencing	Yes	Not Tested	This feature is not supported by the SUT. This is a new UCR requirement and the vendor has until June 2009 to develop this capability.
Progressive Conferencing	No	Certified	Met all CRs and FRs for Progressive Conferencing with the following minor exception: Progressive Conference members do not maintain their assigned precedence level for each leg of the conference.[5]
Nailed-up Connections	No	Not Tested	This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.
DSN Hotline Services	No	Not Certified	The SUT offers this feature however; it does not fully meet all the CRs and FRs for Hotline Services.[6] This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.
MLPP	Yes	Certified	Met all critical CRs and FRs.
Call Processing	Yes	Certified	Met all critical CRs and FRs.
ISDN Services	Yes	Certified	Met all critical CRs and FRs.
Synchronization	Yes	Certified	Met all critical CRs and FRs.
Reliability	Yes	Certified	Met all critical CRs and FRs.
Security	Yes	Certified	See note 7.
VoIP System	No	Certified	The SUT is certified for VoIP specifically with any certified ASLAN posted on the UC APL. The SUT did not meet the IPv6 capability requirement to be compliant no later than 31 December 2008.[8]

Network Gateways				
Gateway	**Interface & Signaling**	**Critical**	**Status**	**Remarks**
PSTN	T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all critical CRs and FRs with the following minor exception: Wink start recognition is not within the required tolerance.[1]
	E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs with the following minor exception: Wink start recognition is not within the required tolerance.[1]
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	This interface is not supported by the SUT. This is not a required interface for a PBX 1. There is no risk associated with the SUT not supporting this feature.

Table 1. SUT Interoperability Test Summary (continued)

NOTES:

1 T1 and E1 CAS wink start recognition is not within the required tolerance of 100 ms to 350 ms. The SUT recognizes a wink start signal from 100 ms to 390 ms over a T1 CAS interface and 100 ms to 395 ms over an E1 CAS interface. Since all switches certified with T1 and/or E1 CAS are required to generate a wink start signal from 140-290 ms, this discrepancy has no operational impact on call processing.

2 The SUT precedence above ROUTINE ring cadence is not within the specification stipulated in the UCR. Since the precedence above ROUTINE ring cadence is distinguished from the ROUTINE ring cadence, there is no operational impact.

3 The SUT call pickup feature doesn't retrieve the call with the highest precedence first. The SUT retrieves unanswered call pickup group calls above ROUTINE in a random sequence. The UCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to either the attendant, night service, or alternate DN. The operational impact is minor.

4 Three-way conference members do not maintain their assigned precedence levels. Since the SUT classmarks the conference members at the highest precedence level, the operational impact is minor.

5 Progressive conference members do not maintain their assigned precedence levels for each respective leg of the conference. Since the SUT classmarks all conference members at the highest precedence level, the operational impact is minor.

6 This feature is supported by SUT. However it does not support ISDN PRI Codeset 5 off Hook Indicator Information Elements for Hotline. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.

7 Security is tested by DISA-led Information Assurance test teams and published in a separate report, reference (c).

8 An IPv6 capable system or product, as defined in the UCR, paragraph 1.7, shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of IPv4. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of the company. The vendor stated, in writing, compliance to the following criteria with one exception; the vendor stated in their LoC that the G350 will not be IPv6 compliant. OSD waived this requirement for the G350 on 19 November 2008.

   a. Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).
   b. Maintaining interoperability in heterogeneous environments and with IPv4.
   c. Commitment to upgrade as the IPv6 standard evolves.
   d. Availability of contractor/vendor IPv6 technical support.

LEGEND:

ANSI	American National Standards Institute	Mbps	Megabits per second
APL	Approved Products List	MFR1	Multi-Frequency Recommendation 1
ASLAN	Assured Services Local Area Network	MLPP	Multi-Level Precedence and Preemption
BRI	Basic Rate Interface	ms	milliseconds
CAS	Channel Associated Signaling	NI 1/2	National ISDN Standard 1 or 2
CRs	Capability Requirements	OSD	Office of the Secretary of Defense
DISA	Defense Information Systems Agency	PBX 1	Private Branch Exchange 1
DN	Directory Number	PRI	Primary Rate Interface
DP	Dial Pulse	PSTN	Public Switched Telephone Network
DSN	Defense Switched Network	Q.931	Signaling Standard for ISDN
DSS1	Digital Subscriber Signaling 1	Q.955.3	ISDN Signaling standard for E1 MLPP
DTMF	Dual Tone Multi-Frequency	SS7	Signaling System 7
E1	European Basic Multiplex Rate (2.048 Mbps)	SUT	System Under Test
FRs	Feature Requirements	T1	Digital Transmission Link Level 1 (1.544 Mbps)
GR	Generic Requirement	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
GR-506-CORE	LSSGR: Signaling for Analog Interfaces		
IPv4	Internet Protocol version 4	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
IPv6	Internet Protocol version 6	UC	Unified Capabilities
ISDN	Integrated Services Digital Network	UCR	Unified Capabilities Requirements
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	VoIP	Voice over Internet Protocol
LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements		

Table 2. PBX 1 Requirements

DSN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP) E1 CAS (MFR1, DTMF, DP) T1 ISDN PRI NI 1/2 (ANSI T1.619a) E1 ISDN PRI (ITU-T Q.955.3)	No No (Europe only) Yes No (Europe only)	Trunking	• PBX Line (C) • Direct Inward Dialing (C) • National ISDN 1/2 Primary Access (R) • ISDN ANSI MLPP Service Capability (R) • ITU-T ISDN Primary Access (Europe only) (C) • ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (Europe only) (C) • Normal Wink Start Operations (C) • Glare Operation (C) • Abnormal Wink Start (C) • Glare Resolution (C) • Call for Service Timing (R) • Guard Timing (R) • Satellite Timing (C) • Disconnect Control (C) • Reselect and Retrial (C) • Off-Hook Supervision Transition (C) • Dial-Pulse Signals (C) • DTMF Signaling (C) • Standard Digit Format for Precedence (C) • MFR1 2/6 Signaling (C) • Alerting Signals and Tones (R) • DSN ISDN User-to-Network Signaling (R) • Application (R) • Physical Layer (R) • Data Link Layer (R) • Data Link Connection (R) • Peer-to-Peer Procedures of Data-Link Layer (R) • Layer 3 DSN User-to-Network Signaling (R) • DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R) • Sequence of Messages for DSN Circuit-Switched Calls (R) • Message Functional Definition and Content (R) • General Message Format and Information Elements Coding (R) • Supplementary Services (C) • PCM-24 Digital Trunk Interface (R) • Interface Characteristics (R) • Supervisory Channel Associated Signaling (C) • Clear Channel Capability (R) • Alarm and Restoral Requirements (R) • PCM-30 Digital Trunk Interface (Europe only) (C) • Interoperation of PCM-24 and PCM-30 (C) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) • Trunk Group-Remove from Service (C) • Trunk Group-Restore to Service (C)	• UCR Section 2.3.1 • UCR Section 2.3.2 • UCR Section 2.3.4.1 • UCR Section 2.3.4.1.1 • UCR Section 2.3.4.2 • UCR Section 2.3.4.2.1 • UCR Section 5.3.3.1.1 • UCR Section 5.3.3.1.2 • UCR Section 5.3.3.2.1 • UCR Section 5.3.3.2.2 • UCR Section 5.3.5 • UCR Section 5.3.6 • UCR Section 5.3.7 • UCR Section 5.3.8 • UCR Section 5.3.9 • UCR Section 5.3.10 • UCR Section 5.4.1 • UCR Section 5.4.2 • UCR Section 5.4.2.1 • UCR Section 5.4.3 • UCR Section 5.5 • UCR Section 5.7.1 • UCR Section 5.7.1.1 • UCR Section 5.7.1.2 • UCR Section 5.7.1.3 • UCR Section 5.7.1.3.1 • UCR Section 5.7.1.3.2 • UCR Section 5.7.1.4 • UCR Section 5.7.1.4.2 • UCR Section 5.7.1.4.3 • UCR Section 5.7.1.4.4 • UCR Section 5.7.1.4.5 • UCR Section 5.7.1.4.6 • UCR Section 7.1 • UCR Section 7.1.1 • UCR Section 7.1.2 • UCR Section 7.1.3 • UCR Section 7.1.4 • UCR Section 7.2 • UCR Section 7.3 • UCR Section 7.4 • UCR Section 7.5 • UCR Section 2.5.5 • UCR Section 2.5.6
		Voice	• MOS (R) • Secure calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• Modem (VBD) (R) • 56 kbps switched data (R: PRI only) • 64 kbps switched data (R: PRI only) • NX56 synchronous BER (R: PRI only) • NX64 synchronous BER (R: PRI only) • Secure data (STE/STU-III) (R)	• CJCSI 6215.01C • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: PRI only)	• FTR 1080B-2002

Table 2. PBX 1 Requirements (continued)

DSN Line Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
2-Wire Analog ISDN BRI NI 1/2 (ANSI T1.619a) 2-Wire Proprietary Digital	Yes No No	Access	• Directory Number Identification (R) • National ISDN 1/2 Basic Access (C) • Analog Line (R) • Basic Line Test Capabilities (R) • Advanced Line Test Capabilities (C) • Loop Start Line (R: 2-Wire Analog only) • Reverse Battery (R) • Alerting Signals and Tones (R) • S/T Reference Point (ISDN BRI) (C)	• UCR Section 2.1.1 • UCR Section 2.3.3 • UCR Section 2.3.5 • UCR Section 2.5.4.1.1 • UCR Section 2.5.4.1.2 • UCR Section 5.2.1 • UCR Section 5.3.1 • UCR Section 5.5 • UCR Section 5.7.1.2.1
		Voice	• MOS (R) • Secure Calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• Modem (VBD) (R) • Secure data (STE/STU-III) (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: BRI only)	• FTR 1080B-2002
DSN Features & Capabilities				
Feature/ Capability	**Critical**	**Requirements Required or Conditional**		**References**
Common Features	Yes	• Individual Lines (R) • Denied originating service (C) • Code restriction and diversion (C) • Call waiting (R) • Three-way calling (R) • Add-on transfer, conference calling, and call hold (C) • Call Transfer Individual – All calls (R) • Call Transfer - Internal Only (R) • Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R) • Call Transfer – Outside (R) • Call Transfer – Add-On Restricted Station (C) • Call Transfer – Attendant (C) • Call Hold (R) • Conference Calling – Six Way Station Controlled (C) • Call forwarding Variable (R) • Call Forward Busy Line (R) • Call Forwarding – Don't Answer – All Calls (R) • Selective Call Forwarding (C) • Call pick-up (C) • Address Translation (C) • Assured Dial Tone (R)		• UCR Section 2.1 • UCR Section 2.1.3 • UCR Section 2.1.4 • UCR Section 2.1.5 • UCR Section 2.1.6 • UCR Section 2.1.7 • UCR Section 2.1.7.1 • UCR Section 2.1.7.2 • UCR Section 2.1.7.3 • UCR Section 2.1.7.4 • UCR Section 2.1.7.5 • UCR Section 2.1.7.6 • UCR Section 2.1.7.7 • UCR Section 2.1.7.8 • UCR Section 2.1.8.1 • UCR Section 2.1.8.2 • UCR Section 2.1.8.3 • UCR Section 2.1.8.4 • UCR Section 2.1.9 • UCR Section 2.7 • UCR Section 2.9
Attendant	No	• Attendant Features (C)		• UCR Section 2.2
Public Safety	Yes	• Emergency Service (911) Caller (R) • Emergency Service (911) Public Safety Answering Service (C) • Enhanced Emergency Service (E911) (C) • Trace of terminating calls (C) • Outgoing call trace (C) • Trace of a Call in Progress (C)		• UCR Section 2.4.1.1 • UCR Section 2.4.1.2 • UCR Section 2.4.1.3 • UCR Section 2.4.2 • UCR Section 2.4.3 • UCR Section 2.4.5
Conferencing	Yes	• Preset Conferencing (C) • Meet-Me Conferencing (R) • Progressive Conferencing (C)		• UCR Section 2.6.1 • UCR Section 2.6.2 • UCR Section 2.6.3
Nailed-up Connections	No	• Nailed-Up Connections (C)		• UCR Section 2.8
DSN Hotline Services	No	• DSN Analog Hotline Service (C)		• UCR Section 2.12

Table 2. PBX 1 Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
MLPP	Yes	• MLPP Overview (R) • Precedence Levels (R) • Announcements (R) • Invocation and Operation (R) • Preemption in the Network (R) • Network Facility with Lower Precedence Calls (R) • Network Facility with Equal or Higher Precedence Calls (R) • MLPP Trunk Selection (R) • Precedence Call Diversion (R) • Channel Associated Signaling (C) • Primary Rate Interface (R) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface (C) • ISDN Primary Rate Interface (R) • Precedence Call Waiting (R) • Call Forwarding (R) • Call Transfer (R) • Call Hold (R) • Three-Way Calling (R) • Call Pickup (C) • Conferencing (C) • Multiline Hunt Group (C) • Community of Interest (C) • MLPP Interaction with EKTS features (C)	• UCR Section 3.1 • UCR Section 3.1.2 • UCR Section 3.1.3 • UCR Section 3.1.4 • UCR Section 3.2 • UCR Section 3.2.1 • UCR Section 3.2.2 • UCR Section 3.2.3 • UCR Section 3.3 • UCR Section 3.4.1 • UCR Section 3.4.2 • UCR Section 3.5 • UCR Section 3.6 • UCR Section 3.7 • UCR Section 3.8.1 • UCR Section 3.8.2 • UCR Section 3.8.3 • UCR Section 3.8.4 • UCR Section 3.8.5 • UCR Section 3.8.6 • UCR Section 3.8.7 • UCR Section 3.8.8 • UCR Section 3.8.9 • UCR Section 3.11
Call Processing	Yes	• Call Treatments (R) • Primary and Alternate Routing (C) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (R) • Termination of Analog Lines (R) • DSN User Dialing (R) • Interswitch and Intraswitch Dialing (R) • Seven-Digit Dialing (R) • Ten-Digit Dialing (R) • Access Code (R) • Access Digit (R) • Precedence Digit (R) • Service Digit (R) • Route Code (R) • Area Code (R) • Switch Code (R) • Line Number (R) • Calling Name Delivery (C) • Calling Number Delivery (R) • Emergency Service 911 Conflict Resolution (R) • DSN Switch Outpulsing Digit Formats (C) • Standard Directory Number (R) • Standard Test Numbers (C) • Base Services – Abbreviated Numbers (C) • Digit Reception Requirements (R) • Screening (C)	• UCR Section 4.1 • UCR Section 4.2 • UCR Section 4.3.1 • UCR Section 4.3.2 • UCR Section 4.3.3 • UCR Section 4.3.4 • UCR Section 4.5.1.1 • UCR Section 4.5.1.2 • UCR Section 4.5.1.2.1 • UCR Section 4.5.1.2.2 • UCR Section 4.5.1.3 • UCR Section 4.5.1.3.1 • UCR Section 4.5.1.3.2 • UCR Section 4.5.1.3.3 • UCR Section 4.5.1.4 • UCR Section 4.5.1.5 • UCR Section 4.5.1.6 • UCR Section 4.5.1.7 • UCR Section 4.5.1.8.1 • UCR Section 4.5.1.8.2 • UCR Section 4.5.1.9 • UCR Section 4.5.2 • UCR Section 4.5.3 • UCR Section 4.5.4 • UCR Section 4.5.5 • UCR Section 4.5.6 • UCR Section 4.5.8

Table 2. PBX 1 Requirements (continued)

DSN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
ISDN Services	Yes	• BRI Access, Call Control and Signaling (C) • Uniform Interface Configuration for BRIs (C) • Electronic Key Telephone Systems (EKTS) (C) • PRI Access, Call Control and Signaling (R) • PRI Features (R) • Packet Data Features and Capabilities (C)	• UCR Section 10, Table 10-1 • UCR Section 10, Table 10-2 • UCR Section 10, Table 10-3 • UCR Section 10, Table 10-4 • UCR Section 10, Table 10-5 • UCR Section 10, Table 10-6
Synchronization	Yes	• Line timing mode (R) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C)	• UCR Section 11.1.1.2 • UCR Section 11.1.2.2 • UCR Section 11.2 • UCR Section 11.3 • UCR Section 11.4
Reliability (See note 1.)	Yes	• System Availability (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS PBX 1 Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R)	• UCR Section 12.2 • UCR Section 12.3 • UCR Section 12.3.1 • UCR Section 12.3.2 • UCR Section 12.3.2.2 • UCR Section 12.3.3 • UCR Section 12.3.4
Security	Yes	• GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	• UCR Section 13
VoIP			
VoIP System	No	VoIP function is conditional. If VoIP is provided, **all** of the following requirements must be met: • Voice Quality with MOS of 4.0 or better (R) • ITU-T G.711 PCM CODEC (R) • MLPP (R) • Security (R) • Network management (C) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) • VoIP System Downtime (IP network 80 min/yr Subscriber 20 min/yr) (R)	• UCR App. 3, para. A3.2.1 • UCR App. 3, para. A3.2.2 • UCR App. 3, para. A3.2.3 • UCR App. 3, para. A3.2.4 • UCR App. 3, para. A3.2.5 • UCR App. 3, para. A3.2.6 • UCR App. 3, para. A3.2.7 • UCR App. 3, para. A3.2.8 • UCR App. 3, para. A3.2.9 • UCR App. 3, para. A3.2.10
Network Gateways			
Gateway	**Critical**	**Requirements Required or Conditional**	**References**
PSTN (See note 2.)	No	Trunking • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (R) • Immediate Start (C) • Delay Dial (C)	• CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.2 • UCR Section 5.3.2 • UCR Section 5.3.4

NOTES:
1 Backup power, power components, UPS requirements, UPS load capacity and alarms are non-testable requirements. It is the responsibility of the respective base/post/camp/station communication agency to provide this with the SUT when installed.
2 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.

Table 2. PBX 1 Requirements (continued)

LEGEND:

2W	2-Wire	FTR 1080B-2002	Video Teleconferencing Services	PAT	Precedence Access Threshold
A/D	Analog to Digital Conversion	G.711	PCM of voice frequencies	PBX 1	Private Branch Exchange 1
ANSI	American National Standards Institute	GR	Generic Requirement	PCM	Pulse Code Modulation
App.	Appendix	GR-512	LSSGR: Reliability, Section 12	PCM-24	Pulse Code Modulation - 24 Channels
BER	Bit Error Ratio	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PCM-30	Pulse Code Modulation - 30 Channels
BRI	Basic Rate Interface			PRI	Primary Rate Interface
C	Conditional	H.320	Standard for Narrowband VTC	PSTN	Public Switched Telephone Network
CAS	Channel Associated Signaling	IP	Internet Protocol	Q.955.3	ISDN Signaling Standard for E1 MLPP
CCS	Common Channel Signaling	IPv6	Internet Protocol version 6	R	Required
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	ISDN	Integrated Services Digital Network	SMEO	Small End Office
CODEC	Coder/Decoder	IT	Information Technology	SS7	Signaling System 7
D/A	Digital to Analog Conversion	ITU-T	International Telecommunication Union-Telecommunication Standardization Sector	STE	Secure Terminal Equipment
DIACAP	DoD Information Assurance Certification and Accreditation Process	kbps	kilobits per second	STIGs	Security Technical Implementation Guides
DISA	Defense Information Systems Agency	KXX	K= any number 2-8; X= any number 1-9	STU-III	Secure Telephone Unit -3rd generation
DISR	DoD IT Standards Registry	Mbps	Megabits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DoD	Department of Defense	MFR1	Multi-Frequency Recommendation 1	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DP	Dial Pulse	min	minute	TIA	Telecommunications Industry Association
DSN	Defense Switched Network	MLPP	Multi-Level Precedence and Preemption	UCR	Unified Capabilities Requirements
DTMF	Dual Tone Multi-Frequency	MOS	Mean Opinion Score	VBD	Variable bit data
E1	European Basic Multiplex Rate (2.048 Mbps)	NI 1/2	National ISDN 1 or 2	VoIP	Voice over Internet Protocol
EIA	Electronic Industries Alliance	NX56	Data format restricted to multiples of 56 kbps	VTC	Video Teleconferencing
FTR	Federal Telecommunications Recommendation	NX64	Data format restricted to multiples of 64 kbps	WWNDP	Worldwide Numbering and Dialing Plan
		para.	paragraph	yr	year

5. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet), or http://199.208.204.125 (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi.

6. The JITC point of contact is Mr. Joseph Roby, DSN 879-0507, commercial (520) 538-0507, FAX DSN 879-4347, or e-mail to joseph.roby@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 0807301.

FOR THE COMMANDER:

2 Enclosures a/s

for RICHARD A. MEADOR
Chief
Battlespace Communications Portfolio

Distribution (electronic mail):
Joint Staff J-6
Joint Interoperability Test Command, Liaison, TE3/JT1
Office of Chief of Naval Operations, CNO N6F2
Headquarters U.S. Air Force, Office of Warfighting Integration & CIO, AF/XCIN (A6N)
Department of the Army, Office of the Secretary of the Army, DA-OSA CIO/G-6 ASA (ALT), SAIS-IOQ
U.S. Marine Corps MARCORSYSCOM, SIAT, MJI Division I
DOT&E, Net-Centric Systems and Naval Warfare
U.S. Coast Guard, CG-64
Defense Intelligence Agency
National Security Agency, DT
Defense Information Systems Agency, TEMC
Office of Assistant Secretary of Defense (NII)/DOD CIO
U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities Division, J68
Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

(c) Joint Interoperability Test Command, "Information Assurance (IA) Assessment of Avaya S8300/G350 Release Communication Manager (CM) 4.0 (R14x.00.2.732.1) with Service Pack 16538 (Tracking Number 0807301)," 13 January 2009
(d) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, "Policy for Department of Defense Voice Services with Real Time Services (RTS)," 9 November 2007
(e) Defense Information Systems Agency, "Department of Defense Networks Unified Capabilities Requirements," 21 December 2007
(f) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP), Change 2," 2 October 2006

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Avaya S8300/G350 Release Communication Manager (CM) 4.0 (R14x.00.2.732.1) with Service Pack 16538; hereinafter referred to as the System Under Test (SUT).

2. PROPONENT. U.S. Army

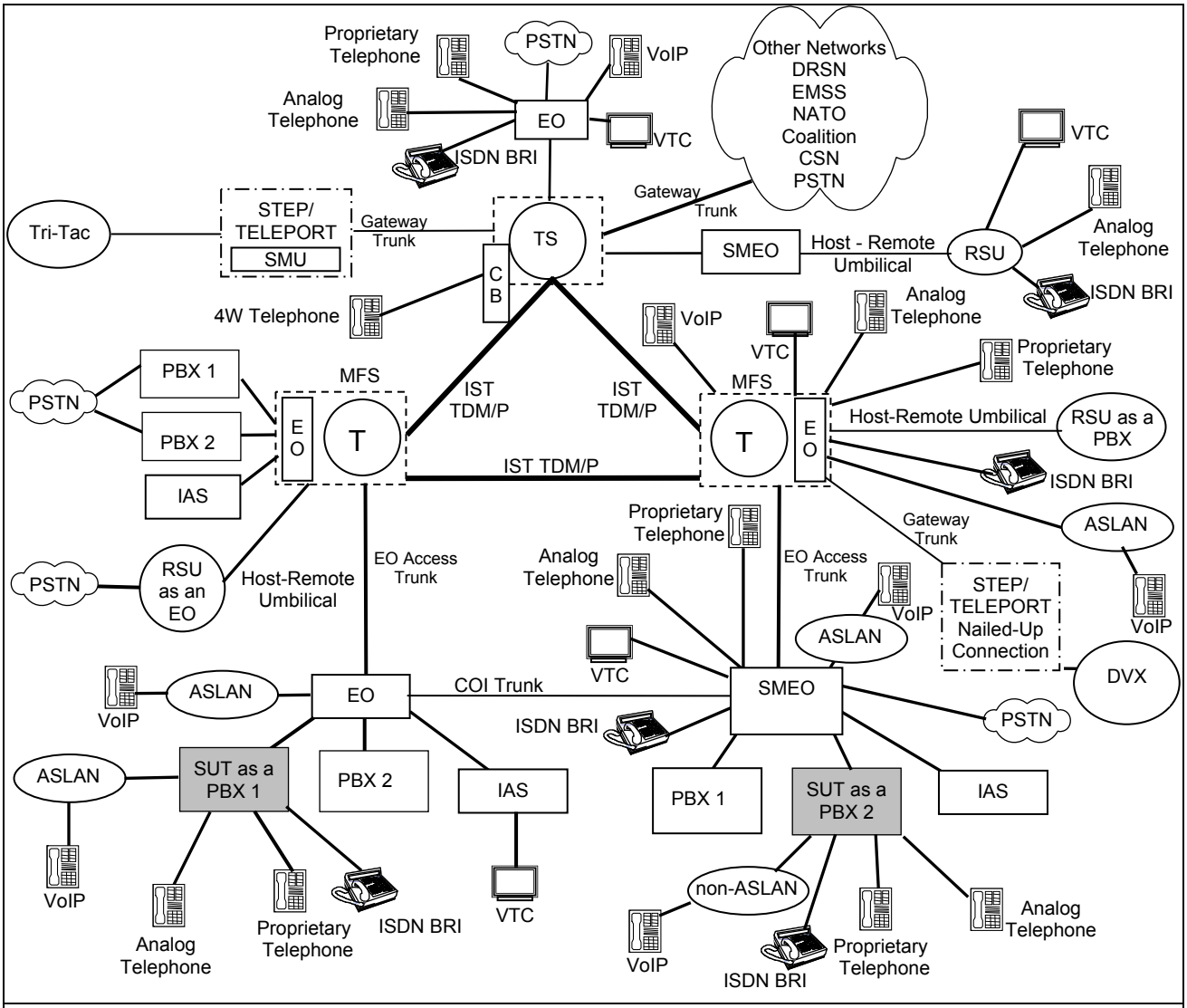
3. PROGRAM MANAGER. Terri Banks, DTS-W Project Manager, GS-12, 2511 Jefferson Davis Highway, Arlington, VA 22202-3926, e-mail: Terri.Banks@hqda.army.mil.

4. TESTER. Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.

5. SYSTEM UNDER TEST DESCRIPTION. The SUT is a Private Branch Exchange (PBX) 1. The Avaya S8300 Media Server is a 19" rack-mounted, Pentium processor based unit with 512MB of Random Access Memory (RAM) running the Linux operating system and occupies a single slot on a G350. The S8300 Media Server provides a Voice over Internet Protocol (VoIP)-based integrated messaging capability for up to 450 light duty users. The SUT can support more than one G350 gateway; however, due to timing issues noted during testing, the SUT is certified with only one G350. The S8300 Media Server provides Avaya CM processing functions in stand-alone, single-port network telephony systems requiring up to 500 stations. This system resides in the TN8400AP interface card. The solution contains both a management Local Area Network (LAN) and a Media LAN. The media LAN passes both Voice and Data traffic whereas the management LAN is used solely for management purposes. The system is secured on the Management LAN by using the ASG software and secured on the media LAN by using DoD PKI. Each SUT G350 gateway can support up to two Digital Transmission Link Level 1 (T1)/European Basic Multiplex Rate (E1) interfaces. Each SUT G350 gateway can support the following lines in any combination as long as the total number of lines does not exceed 40: 40 IP, 40 analog, 40 digital, and 16 Basic Rate Interface (BRI).

The Avaya S8300 with CM 4.0 is managed using an administrative laptop with Windows XP Service Pack 3 (SP3) loaded with the Avaya ASG software, and interfaces with the Apache Web server on the S8300. The Avaya S8300 uses Secure Shell and Transport Layer Security to secure connections between the administrative laptop, and the S8300.

6. OPERATIONAL ARCHITECTURE. The Defense Switched Network (DSN) architecture is a two-level network hierarchy consisting of DSN backbone switches and Service/Agency installation switches. Joint Staff policy and subscriber mission requirements determine which type of switch can be used at a particular location. The DSN architecture, therefore, consists of several categories of switches including PBXs. The Unified Capabilities Requirements (UCR) operational DSN Architecture is depicted in Figure 2-1. The architecture depicts the relationship of Military Department PBX 1s to the other DSN switch types.



LEGEND:

4W	4-Wire
ASLAN	Assured Services Local Area Network
BRI	Basic Rate Interface
CB	Channel Bank
COI	Community of Interest
CSN	Canadian Switch Network
DRSN	Defense Red Switch Network
DSN	Defense Switched Network
DVX	Deployable Voice Exchange
EMSS	Enhanced Mobile Satellite System
EO	End Office
IAS	Integrated Access Switch
ISDN	Integrated Services Digital Network
IST	Interswitch Trunk
MFS	Multifunction Switch
NATO	North Atlantic Treaty Organization
PBX	Private Branch Exchange
PBX 1	Private Branch Exchange 1
PBX 2	Private Branch Exchange 2
PSTN	Public Switched Telephone Network
RSU	Remote Switching Unit
SMEO	Small End Office
SMU	Switched Multiplex Unit
STEP	Standardized Tactical Entry Point
SUT	System Under Test
TDM/P	Time Division Multiplex/Packetized
Tri-Tac	Tri-Service Tactical Communications Program
TS	Tandem Switch
VoIP	Voice over Internet Protocol
VTC	Video Teleconferencing

Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to PBX 1s are listed in Table 2-1. These requirements are derived from:

a. DSN services for Network and Applications specified in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6215.01C, “Policy for Department of Defense Voice Services with Real Time Services (RTS).”

b. UCR interface and signaling requirements for trunks/lines verified through JITC testing and/or vendor submission of Letters of Compliance (LoC).

c. UCR PBX 1 Capability Requirements (CRs) and Feature Requirements (FRs) verified through JITC testing and/or vendor submission of LoC.

Table 2-1. PBX 1 Requirements

DSN Trunk Interfaces				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP)	No	Trunking	• PBX Line (C)	• UCR Section 2.3.1
			• Direct Inward Dialing (C)	• UCR Section 2.3.2
			• National ISDN 1/2 Primary Access (R)	• UCR Section 2.3.4.1
			• ISDN ANSI MLPP Service Capability (R)	• UCR Section 2.3.4.1.1
			• ITU-T ISDN Primary Access (Europe only) (C)	• UCR Section 2.3.4.2
			• ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (Europe only) (C)	• UCR Section 2.3.4.2.1
			• Normal Wink Start Operations (C)	• UCR Section 5.3.3.1.1
			• Glare Operation (C)	• UCR Section 5.3.3.1.2
			• Abnormal Wink Start (C)	• UCR Section 5.3.3.2.1
			• Glare Resolution (C)	• UCR Section 5.3.3.2.2
			• Call for Service Timing (R)	• UCR Section 5.3.5
			• Guard Timing (R)	• UCR Section 5.3.6
			• Satellite Timing (C)	• UCR Section 5.3.7
			• Disconnect Control (C)	• UCR Section 5.3.8
			• Reselect and Retrial (C)	• UCR Section 5.3.9
			• Off-Hook Supervision Transition (C)	• UCR Section 5.3.10
E1 CAS (MFR1, DTMF, DP)	No (Europe only)		• Dial-Pulse Signals (C)	• UCR Section 5.4.1
			• DTMF Signaling (C)	• UCR Section 5.4.2
			• Standard Digit Format for Precedence (C)	• UCR Section 5.4.2.1
			• MFR1 2/6 Signaling (C)	• UCR Section 5.4.3
			• Alerting Signals and Tones (R)	• UCR Section 5.5
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes		• DSN ISDN User-to-Network Signaling (R)	• UCR Section 5.7.1
			• Application (R)	• UCR Section 5.7.1.1
			• Physical Layer (R)	• UCR Section 5.7.1.2
			• Data Link Layer (R)	• UCR Section 5.7.1.3
			• Data Link Connection (R)	• UCR Section 5.7.1.3.1
			• Peer-to-Peer Procedures of Data-Link Layer (R)	• UCR Section 5.7.1.3.2
			• Layer 3 DSN User-to-Network Signaling (R)	• UCR Section 5.7.1.4
			• DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	• UCR Section 5.7.1.4.2
			• Sequence of Messages for DSN Circuit-Switched Calls (R)	• UCR Section 5.7.1.4.3
			• Message Functional Definition and Content (R)	• UCR Section 5.7.1.4.4
			• General Message Format and Information Elements Coding (R)	• UCR Section 5.7.1.4.5
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)		• Supplementary Services (C)	• UCR Section 5.7.1.4.6
			• PCM-24 Digital Trunk Interface (R)	• UCR Section 7.1
			• Interface Characteristics (R)	• UCR Section 7.1.1
			• Supervisory Channel Associated Signaling (C)	• UCR Section 7.1.2
			• Clear Channel Capability (R)	• UCR Section 7.1.3
			• Alarm and Restoral Requirements (R)	• UCR Section 7.1.4
			• PCM-30 Digital Trunk Interface (Europe only) (C)	• UCR Section 7.2
			• Interoperation of PCM-24 and PCM-30 (C)	• UCR Section 7.3
			• Analog Trunk Interface (C)	• UCR Section 7.4
			• Integrated Digital Loop Carrier (C)	• UCR Section 7.5
			• Trunk Group-Remove from Service (C)	• UCR Section 2.5.5
			• Trunk Group-Restore to Service (C)	• UCR Section 2.5.6

Table 2-1. PBX 1 Requirements (continued)

DSN Trunk Interfaces (continued)				
Interface	**Critical**	**Requirements Required or Conditional**		**References**
T1 CAS (MFR1, DTMF, DP) E1 CAS (MFR1, DTMF, DP) T1 ISDN PRI NI 1/2 (ANSI T1.619a) E1 ISDN PRI (ITU-T Q.955.3)	No No (Europe only) Yes No (Europe only)	Trunking (continued)	• Interoperation of PCM-24 and PCM-30 (C) • Analog Trunk Interface (C) • Integrated Digital Loop Carrier (C) • Trunk Group-Remove from Service (C) • Trunk Group-Restore to Service (C)	• UCR Section 7.3 • UCR Section 7.4 • UCR Section 7.5 • UCR Section 2.5.5 • UCR Section 2.5.6
		Voice	• MOS (R) • Secure calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• Modem (VBD) (R) • 56 kbps switched data (R: PRI only) • 64 kbps switched data (R: PRI only) • NX56 synchronous BER (R: PRI only) • NX64 synchronous BER (R: PRI only) • Secure data (STE/STU-III) (R)	• CJCSI 6215.01C • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • UCR Section 3.10 • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: PRI only)	• FTR 1080B-2002
DSN Line Interfaces				
2-Wire Analog ISDN BRI NI 1/2 (ANSI T1.619a) 2-Wire Proprietary Digital	Yes No No	Access	• Directory Number Identification (R) • National ISDN 1/2 Basic Access (C) • Analog Line (R) • Basic Line Test Capabilities (R) • Advanced Line Test Capabilities (C) • Loop Start Line (R: 2-Wire Analog only) • Reverse Battery (R) • Alerting Signals and Tones (R) • S/T Reference Point (ISDN BRI) (C)	• UCR Section 2.1.1 • UCR Section 2.3.3 • UCR Section 2.3.5 • UCR Section 2.5.4.1.1 • UCR Section 2.5.4.1.2 • UCR Section 5.2.1 • UCR Section 5.3.1 • UCR Section 5.5 • UCR Section 5.7.1.2.1
		Voice	• MOS (R) • Secure Calls (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		Facsimile	• Analog: ITU-T T.4 (R)	• DISR
		Data	• Modem (VBD) (R) • Secure data (STE/STU-III) (R)	• CJCSI 6215.01C • CJCSI 6215.01C
		VTC	• ITU-T H.320 (R: BRI only)	• FTR 1080B-2002
DSN Features & Capabilities				
Feature/ Capability	**Critical**	**Requirements Required or Conditional**		**References**
Common Features	Yes	• Individual Lines (R) • Denied originating service (C) • Code restriction and diversion (C) • Call waiting (R) • Three-way calling (R) • Add-on transfer, conference calling, and call hold (C) • Call Transfer Individual – All calls (R) • Call Transfer - Internal Only (R) • Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R) • Call Transfer – Outside (R) • Call Transfer – Add-On Restricted Station (C) • Call Transfer – Attendant (C) • Call Hold (R) • Conference Calling – Six Way Station Controlled (C) • Call forwarding Variable (R) • Call Forward Busy Line (R) • Call Forwarding – Don't Answer – All Calls (R) • Selective Call Forwarding (C) • Call pick-up (C) • Address Translation (C) • Assured Dial Tone (C)		• UCR Section 2.1 • UCR Section 2.1.3 • UCR Section 2.1.4 • UCR Section 2.1.5 • UCR Section 2.1.6 • UCR Section 2.1.7 • UCR Section 2.1.7.1 • UCR Section 2.1.7.2 • UCR Section 2.1.7.3 • UCR Section 2.1.7.4 • UCR Section 2.1.7.5 • UCR Section 2.1.7.6 • UCR Section 2.1.7.7 • UCR Section 2.1.7.8 • UCR Section 2.1.8.1 • UCR Section 2.1.8.2 • UCR Section 2.1.8.3 • UCR Section 2.1.8.4 • UCR Section 2.1.9 • UCR Section 2.7 • UCR Section 2.9

Table 2-1. PBX 1 Requirements (continued)

DSN Features & Capabilities			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Attendant	No	• Attendant Features (C)	• UCR Section 2.2
Public Safety	Yes	• Emergency Service (911) Caller (R) • Emergency Service (911) Public Safety Answering Service (R) • Enhanced Emergency Service (E911) (C) • Trace of terminating calls (C) • Outgoing call trace (C) • Trace of a call in progress (C)	• UCR Section 2.4.1.1 • UCR Section 2.4.1.2 • UCR Section 2.4.1.3 • UCR Section 2.4.2 • UCR Section 2.4.3 • UCR Section 2.4.5
Conferencing	Yes	• Preset Conferencing (C) • Meet-Me Conferencing (R) • Progressive Conferencing (C)	• UCR Section 2.6 • UCR Section 2.6.2 • UCR Section 2.6.3
Nailed-up Connections	No	• Nailed-Up Connections (C)	• UCR Section 2.8
DSN Hotline Services	No	• DSN Analog Hotline Service (C)	• UCR Section 2.12
MLPP	Yes	• MLPP Overview (R) • Preemption in the Network (R) • Network Facility with Lower Precedence Calls (R) • Network Facility with Equal or Higher Precedence Calls (R) • Precedence Call Diversion (R) • Channel Associated Signaling (C) • Primary Rate Interface (R) • Analog Line MLPP (R) • ISDN MLPP Basic Rate Interface (C) • ISDN Primary Rate Interface (R) • Precedence Call Waiting (R) • Call Forwarding (R) • Call Transfer (R) • Call Hold (R) • Three-Way Calling (R) • Call Pickup (C) • Conferencing (C) • Multiline Hunt Group (C) • Community of Interest (C) • MLPP Interaction with EKTS features (C)	• UCR Section 3.1 • UCR Section 3.2 • UCR Section 3.2.1 • UCR Section 3.2.2 • UCR Section 3.3 • UCR Section 3.4.1 • UCR Section 3.4.2 • UCR Section 3.5 • UCR Section 3.6 • UCR Section 3.7 • UCR Section 3.8.1 • UCR Section 3.8.2 • UCR Section 3.8.3 • UCR Section 3.8.4 • UCR Section 3.8.5 • UCR Section 3.8.6 • UCR Section 3.8.7 • UCR Section 3.8.8 • UCR Section 3.8.9 • UCR Section 3.11

Table 3. PBX 1 Requirements (continued)

DSN Features & Capabilities (continued)			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
Call Processing	Yes	• Call Treatments (R) • Primary and Alternate Routing (C) • E&M Lead Signaling States (C) • 4-Wire Analog User Access Lines (C) • 2-Wire User Access Lines (R) • Termination of Analog Lines (R) • DSN User Dialing (R) • Interswitch and Intraswitch Dialing (R) • Seven-Digit Dialing (R) • Ten-Digit Dialing (R) • Access Code (R) • Access Digit (R) • Precedence Digit (R) • Service Digit (R) • Route Code (R) • Area Code (R) • Switch Code (R) • Line Number (R) • Calling Name Delivery (C) • Calling Number Delivery (R) • Emergency Service 911 Conflict Resolution (R) • DSN Switch Outpulsing Digit Formats (C) • Standard Directory Number (R) • Standard Test Numbers (C) • Base Services – Abbreviated Numbers (C) • Digit Reception Requirements (R) • Screening (C)	• UCR Section 4.1 • UCR Section 4.2 • UCR Section 4.3.1 • UCR Section 4.3.2 • UCR Section 4.3.3 • UCR Section 4.3.4 • UCR Section 4.5.1.1 • UCR Section 4.5.1.2 • UCR Section 4.5.1.2.1 • UCR Section 4.5.1.2.2 • UCR Section 4.5.1.3 • UCR Section 4.5.1.3.1 • UCR Section 4.5.1.3.2 • UCR Section 4.5.1.3.3 • UCR Section 4.5.1.4 • UCR Section 4.5.1.5 • UCR Section 4.5.1.6 • UCR Section 4.5.1.7 • UCR Section 4.5.1.8.1 • UCR Section 4.5.1.8.2 • UCR Section 4.5.1.9 • UCR Section 4.5.2 • UCR Section 4.5.3 • UCR Section 4.5.4 • UCR Section 4.5.5 • UCR Section 4.5.6 • UCR Section 4.5.8
ISDN Services	Yes	• BRI Access, Call Control and Signaling (C) • Uniform Interface Configuration for BRIs (C) • Electronic Key Telephone Systems (EKTS) (C) • PRI Access, Call Control and Signaling (R) • PRI Features (R) • Packet Data Features and Capabilities (C)	• UCR Section 10, Table 10-1 • UCR Section 10, Table 10-2 • UCR Section 10, Table 10-3 • UCR Section 10, Table 10-4 • UCR Section 10, Table 10-5 • UCR Section 10, Table 10-6
Synchronization	Yes	• Line timing mode (R) • Internal Stratum 4 (R) • Synchronization Performance Monitoring Criteria (C) • DS1 Traffic Interfaces (C) • DS0 Traffic Interconnects (C)	• UCR Section 11.1.1.2 • UCR Section 11.1.2.2 • UCR Section 11.2 • UCR Section 11.3 • UCR Section 11.4
Reliability	Yes	• System Availability (R) • Backup Power (R) • Power Components (R) • UPS Requirements (R) • UPS PBX 1 Load Capacity (R) • Backup Power (Environmental) (R) • Alarms (R)	• UCR Section 12.2 • UCR Section 12.3 • UCR Section 12.3.1 • UCR Section 12.3.2 • UCR Section 12.3.2.2 • UCR Section 12.3.3 • UCR Section 12.3.4
Security	Yes	• GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	• UCR Section 13

Table 3. PBX 1 Requirements (continued)

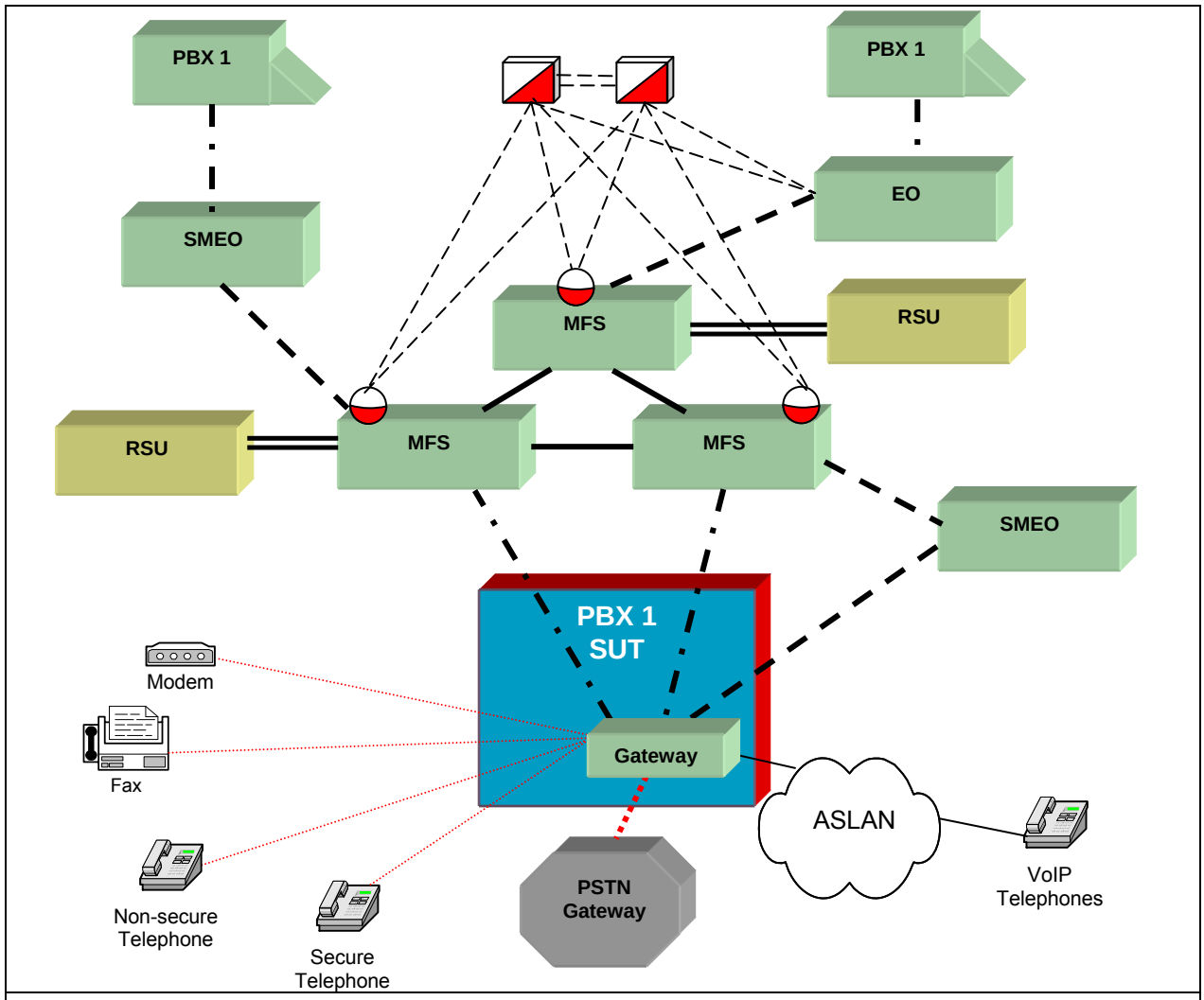
VoIP			
Feature/ Capability	**Critical**	**Requirements Required or Conditional**	**References**
VoIP System	No	VoIP function is conditional. If VoIP is provided, **all** of the following requirements must be met: • Voice Quality with MOS of 4.0 or better (R) • ITU-T G.711 PCM CODEC (R) • MLPP (R) • Security (R) • Network management (C) • System timing (R) • Latency ≤ 60 milliseconds (R) • IPv6 capable (R) • Service Class Tagging (R) • VoIP System Downtime (IP network 80 min/yr Subscriber 20 min/yr) (R)	• UCR App. 3, para. A3.2.1 • UCR App. 3, para. A3.2.2 • UCR App. 3, para. A3.2.3 • UCR App. 3, para. A3.2.4 • UCR App. 3, para. A3.2.5 • UCR App. 3, para. A3.2.6 • UCR App. 3, para. A3.2.7 • UCR App. 3, para. A3.2.8 • UCR App. 3, para. A3.2.9 • UCR App. 3, para. A3.2.10
Network Gateways			
Gateway	**Critical**	**Requirements Required or Conditional**	**References**
PSTN (See note.)	No	Trunking • Positive Identification Control (C) • On-Netting (C) • Off-Netting (C) • Ground Start Line (R) • Immediate Start (C) • Delay Dial (C)	• CJCSI 6215.01C • CJCSI 6215.01C • CJCSI 6215.01C • UCR Section 5.2.2 • UCR Section 5.3.2 • UCR Section 5.3.4

NOTE: Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.

LEGEND:

ANSI	American National Standards Institute	FTR 1080B-2002	Video Teleconferencing Services	PCM	Pulse Code Modulation
BER	Bit Error Ratio	G.711	PCM of voice frequencies	PCM-24	Pulse Code Modulation - 24 Channels
BRI	Basic Rate Interface	GR	Generic Requirement	PCM-30	Pulse Code Modulation - 30 Channels
C	Conditional	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PRI	Primary Rate Interface
CAS	Channel Associated Signaling			PSTN	Public Switched Telephone Network
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	H.320	Standard for Narrowband VTC	Q.955.3	ISDN Signaling Standard for E1 MLPP
CODEC	Coder/Decoder	IP	Internet Protocol	R	Required
DIACAP	DoD Information Assurance Certification and Accreditation Process	IPv6	Internet Protocol version 6	S/T	ISDN BRI four-wire interface
		ISDN	Integrated Services Digital Network	SS7	Signaling System 7
DISR	DoD IT Standards Registry	IT	Information Technology	STE	Secure Terminal Equipment
DoD	Department of Defense	ITU-T	International Telecommunication Union-Telecommunication Standardization Sector	STIGs	Security Technical Implementation Guides
DoDI	Department of Defense Instruction			STU-III	Secure Telephone Unit -3rd generation
DP	Dial Pulse	kbps	kilobits per second	T.4	Standardization of Group 3 facsimile terminals for document transmission
DS0	Digital Signal Level 0 (64 kbps)	Mbps	Megabits per second		
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	MFR1	Multi-Frequency Recommendation 1	T1	Digital Transmission Link Level 1 (1.544 Mbps)
		min	minute	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DSN	Defense Switched Network	MLPP	Multi-Level Precedence and Preemption	UCR	Unified Capabilities Requirements
DTMF	Dual Tone Multi-Frequency	MOS	Mean Opinion Score	UPS	Uninterruptible Power Supply
E&M	Ear and Mouth	NI 1/2	National ISDN Standard 1 or 2	VBD	Variable bit data
E1	European Basic Multiplex Rate (2.048 Mbps)	NX56	Data format restricted to multiples of 56 kbps	VoIP	Voice over Internet Protocol
EKTS	Electronic Key Telephone System	NX64	Data format restricted to multiples of 64 kbps	VTC	Video Teleconferencing
FTR	Federal Telecommunications Recommendation	para.	paragraph	yr	year
		PBX	Private Branch Exchange		
		PBX 1	Private Branch Exchange 1		

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DSN operational environment. Testing of the system's required functions and features was conducted using the notional test configuration depicted in Figure 2-2. The SUT test configuration is depicted in Figure 2-3. The SUT was tested as the end-point in relation to the other switches.

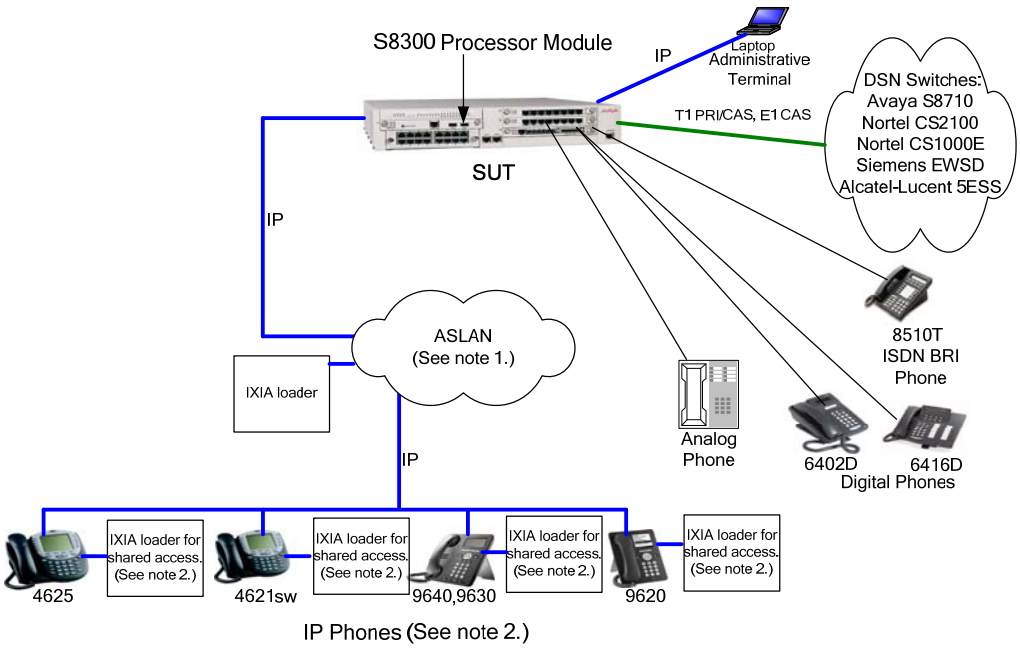


LEGEND:

ASLAN	Assured Services Local Area Network
BRI	Basic Rate Interface
CAS	Channel Associated Signaling
DSN	Defense Switched Network
E1	European Basic Multiplex Rate (2.048 Mbps)
EO	End Office
FAX	facsimile
ISDN	Integrated Services Digital Network
Mbps	Megabits per second
MFS	Multifunction Switch
PBX	Private Branch Exchange
PBX 1	Private Branch Exchange Type 1
PRI	Primary Rate Interface
PSTN	Public Switched Telephone Network
RSU	Remote Switching Unit
SMEO	Small End Office
SS7	Signaling System 7
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
TCP/IP	Transmission Control Protocol/Internet Protocol
VoIP	Voice over Internet Protocol

- SS7 Service Switching Point (SSP)
- SS7 Signal Transfer Point (STP)
- PSTN Gateway Trunk
- DSN Interswitch Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)
- DSN Line (2 Wire Analog, ISDN BRI, Digital Proprietary)
- SS7 Links (A-Link, B-Link, or C-Link)
- TCP/IP
- DSN End Office Access Trunk (T1/E1 SS7, T1/E1 CAS, T1/E1 ISDN PRI)
- DSN PBX Access Trunk (T1/E1 CAS, T1/E1 ISDN PRI)
- RSU-Host Umbilical Link

Figure 2-2. Notional Test Configuration



LEGEND:

5ESS	Class 5 Electronic Switching System
ASLAN	Assured Services Local Area Network
BRI	Basic Rate Interface
CS	Communication Server
DSN	Defense Switched Network
E1	European Basic Multiplex Rate (2.048 Mbps)
EWSD	Elektronisches Wählsystem Digital
IP	Internet Protocol
ISDN	Integrated Services Digital Network
Mbps	Megabits per second
PRI	Primary Rate Interface
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
UC	Unified Capabilities
VoIP	Voice over Internet Protocol

NOTES:

1 The SUT is certified with any ASLAN listed on the UC Approved Products List.

2 The phones are certified for shared access at 10/100 Mbps.

Figure 2-3. SUT Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DSN switches noted in Table 2-2. The DSN switches listed in Table 2-2 only depict the tested configuration. Table 2-2 is not intended to identify the only switches that are certified with the SUT. The SUT is certified with switching systems listed on the DSN Approved Products List (APL) that offer the same certified interfaces.

Table 2-2. Tested System Configurations

System Name	Software Release
Nortel CS2100	Succession Enterprise (SE) 09.1
Nortel CS1000E	5.0
Siemens EWSD	19d with Patch Set 46
Alcatel-Lucent 5ESS	5E16.2 Broadcast Warning Message (BWM) 08-0002
Avaya S8710	Communication Manager (CM) 4.0 (R014x.00.2.731.7: Super Patch 14419)

System Name		Hardware/Software Release			
	Release	Hardware	Card Name Part Number/ Name	Software/Firmware	
SUT	CM4.0(R14x.00.2 .732.1) with Service Pack 16538	Management Workstation	Windows XP SP3	ASA	4.0.12
				ASG	2.2.1
				Symantec Anti-Virus	15.5.0.23
		G350 Primary (S8300) VxWorks 5.4.2	S8300 ICC/LSP Processor	Firmware C V2	
				Communications Manager 4.0.2-732	
				Red Hat Linux Enterprise Server 4.0	4-2.6.11
				Apache Web Server	2.0.52
			MM711 Analog Media Module	VH 27	
			MM710/ E1/T1 Media Module	VH 11	
			MM710B E1/T1 Media Module	VH 11	
			MM720 BRI Media Module	VH 7	
			MM712 DCP Media Modules 8 port	VH 27	
			MM312 DCP Media Modules 24 Port	VH 01	

SUT Telephone Instruments		
Telephone type	**Model (s)**	**Software/Firmware**
ISDN BRI	Avaya 8510T	NA
ISDN BRI	Tone Commander: 6210U, 6210T, 6220U, 6220T, 6220T TSG, 8610U, 8610T, 8620U, and 8620T	Release 01.07.22
ISDN BRI	8810U and 8810T	Release 02.07.22
Digital	6402D, 2420, 6408D, 6416D+M, 6402	NA
IP	4625sw	a25d01a2_8.bin/b25d01a2_8.bin
IP	4621sw	a20d01b2_8.bin/b20d01b2_8.bin
IP	9640, 9630	ha96100ua1S.bin/hb96xxua1_50.bin
IP	9620	ha96100ua1S.bin/hb96xxua1_50.bin
Secure	STE	Software Release 2.4, Boot Code 0018
Secure	STE	Software Release 2.5, Boot Code 0018

Table 2-2. Tested System Configurations (continued)

LEGEND:

ASA	Avaya Site Administration	ISDN	Integrated Services Digital Network
ASG	Access Security Gateway	LSP	Local Survivable Processing
BRI	Basic Rate Interface	NA	Not Applicable
CM	Communications Manager	Rel.	Release
E1	European Standard Carrier 1	SP3	Service Pack 3
ICC	Internal Call Controller	T1	T-Carrier 1
IP	Internet Protocol	XP	Experience

10. TESTING LIMITATIONS. None.

11. TEST RESULTS

a. Discussion

(1) DSN Trunk Interfaces. The SUT met all critical CRs and FRs for the following interfaces with the minor exceptions noted in the subparagraphs below: T1 CAS with Dual Tone Multi-Frequency (DTMF), Dial Pulse (DP), and Multi-Frequency Recommendation 1 (MFR1) signaling; E1 CAS with DTMF, DP, and MFR1 signaling; and T1 ISDN PRI National ISDN Standard 1 or 2 (NI 1/2) American National Standards Institute (ANSI) T1619a.

(a) The T1 CAS wink start recognition is not within the required tolerance of 100 ms to 350 ms as stated in the UCR, section 5.3.3.2.1. The SUT recognizes a wink from 100 ms to 390 ms. Since all switches certified with T1 CAS are required to generate a wink start signal from 140-290 milliseconds (ms), this discrepancy has no operational impact on call processing.

(b) The E1 CAS wink start recognition is not within the required tolerance of 100 ms to 350 ms as stated in the UCR, section 5.3.3.2.1. The SUT recognizes a wink from 100 ms to 395 ms. Since all switches certified with E1 CAS are required to generate a wink start signal from 140-290 ms, this discrepancy has no operational impact on call processing.

(2) DSN Line Interfaces. The SUT met all critical interoperability certification requirements for 2-Wire Analog (GR-506-CORE), ISDN BRI NI 1/2 (ANSI T1.619a), 2-Wire Proprietary Digital, and VoIP DSN line interfaces with the following minor exception: The SUT precedence above ROUTINE ring cadence is not within the specification stipulated in the UCR. Since the precedence above ROUTINE ring cadence is distinguished from the ROUTINE ring cadence, there is no operational impact.

(3) Features and Capabilities

(a) Common Features. The SUT met all critical interoperability certification requirements for Common Features with the minor exceptions noted in the subparagraphs below:

1. The SUT call pickup feature doesn't retrieve the call with the highest precedence first. The SUT retrieves unanswered call pickup group calls above ROUTINE in a random sequence. The UCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to either the attendant, night service, or alternate DN. The operational impact is minor.

2. Three-way conference members do not maintain their assigned precedence levels when different precedent levels are established for each leg of the conference. Since the SUT classmarks the conference members at the highest precedence level, the operational impact is minor.

(b) Attendant. This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.

(c) Public Safety. The SUT met all critical CRs and FRs for Basic 911. Additionally the SUT met the following non-critical CRs and FRs: Tracing of a Terminating Call, Outgoing Call Tracing, and Trace of a Call in Progress.

(d) Conferencing. The SUT does not support Meet-me Conferencing. This is a new UCR requirement and the vendor has until June 2009 to develop this capability. The SUT does not support Progressive Conferencing. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature. The SUT met all CRs and FRs for Progressive Conferencing with the following minor exception: Progressive Conference members do not maintain their assigned precedence level for each leg of the conference. Since the SUT classmarks all conference members at the highest precedence level, the operational impact is minor.

(e) Nailed-up Connections. This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.

(f) DSN Hotline Services. The SUT does not meet the critical CRs and FRs requirements for Hotline Services and this feature is therefore not certified by JITC nor authorized for use within the DSN. The SUT does not support hotline protection via any DSN trunk. In addition, the SUT does not support the T1 and E1 ISDN PRI Codeset 5 off Hook Indicator Information Element for Hotline Services. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.

(g) MLPP. The SUT met all critical CRs and FRs.

(h) Call Processing. The SUT met all critical CRs and FRs.

(i) ISDN Services. The SUT met all critical CRs and FRs for PRI Access Call Control and Signaling and PRI Features. Additionally the SUT met the non-critical CRs and FRs for BRI Access, Call Control and Signaling, Uniform Interface Configurations for BRIs, and Electronic Key Telephone Systems.

(j) Synchronization. The SUT met all critical CRs and FRs for this feature. The SUT supports line timing mode and Internal Stratum 4 for synchronization.

(k) Reliability. All critical CRs and FRs for this feature were met by the SUT and verified by vendor LoC.

(l) Security. Security is tested by DISA-led Information Assurance test teams and published in a separate report, reference (c).

(4) VoIP. The SUT is certified with any ASLAN on the DSN APL.

(a) VoIP System. The UCR, appendix 3, section A3.2, outlines the requirements for the VoIP system. The VoIP system requirements encompass end-to-end VoIP requirements. The following paragraphs detail the results of the SUT VoIP solution.

1. Voice Quality. In accordance with the UCR, appendix 3, section A3.2.1, VoIP calls shall have an average Mean Opinion Score (MOS) of at least 4.0 as measured in accordance with ITU-T P.800 voice quality standards. This applies from handset to handset and from handset to gateway trunk in the DSN. For intra-switch calls, the SUT VoIP solution had an average MOS of 4.25 with a minimum measured MOS value of 4.01. The average inter-switch MOS was 4.24 with a minimum measured MOS value of 4.02. This average was based on a total of 1200 calls. Additionally, VoIP systems shall not lose more than 150 ms of voice media in any five-minute period. This applies from handset to handset and from handset to gateway trunk to the DSN. The SUT met this requirement with a loss of no more than 20 ms of voice media packets in any five-minute period.

2. Codec. In accordance with the UCR, appendix 3, section A3.2.2, the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) G.711 Pulse Code Modulation (PCM) CODEC with a 20 ms packet fill was required and was met by the SUT VoIP solution.

3. Multi-Level Precedence and Preemption (MLPP). In accordance with the UCR, appendix 3, section A3.2.3, the VoIP system shall meet all MLPP

requirements identified in UCR, section 3. All critical MLPP features and functions were met by the SUT.

4. Security. Security requirements in accordance with the UCR, appendix 3, section A3.2.4, are verified using the Information Assurance Test Plan. Results of the security testing are reported in a separate test report generated by the DISA Information Assurance test personnel, reference (c).

5. Network Management (NM). In accordance with the UCR, appendix 3, section A3.2.5, the vendor is required to provide a management system to monitor the performance of the ASLAN portion of the VoIP system. This requirement was verified via a LoC because of the numerous third party systems and applications capable of performing this function. The switching system NM requirements in accordance with the UCR, section 9, are not required for a PBX 1 and were not tested.

6. Synchronization. In accordance with the UCR, appendix 3, section A3.2.6, the VoIP system shall meet all synchronization requirements identified in UCR, section 11. The SUT derived synchronization with line timing mode via traditional T1 Time Division Multiplexing (TDM)-based interfaces.

7. Latency. The UCR, appendix 3, section A3.2.7, states that one-way system latency for the VoIP system must be 60 ms or less as averaged over any five-minute period. The latency requirement is measured from IP handset to the egress trunk. The SUT average latency over 340 inter-switch calls, with a minimum duration of 5 minutes for each call, was measured to be 55.22 ms.

8. IPv6. An IPv6 capable system or product, as defined in the UCR, paragraph 1.7, shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of IPv4. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of the company. The vendor stated, in writing, compliance to the following criteria with one exception; the vendor stated in their LoC that the G350 will not be IPv6 compliant. OSD waived this requirement on 19 November 2008.

a. Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).

b. Maintaining interoperability in heterogeneous environments and with IPv4.

c. Commitment to upgrade as the IPv6 standard evolves.

d. Availability of contractor/vendor IPv6 technical support.

9. In accordance with the UCR, appendix 3, section A3.2.9.1, the VoIP system components (i.e. Media Gateway, and Session Control Agent) shall meet the following requirements:

a. All components shall be capable of implementing Service Class tagging using the 6-bit Differentiated Services Code Points (DSCPs) field in the IP header. The SUT end instruments used 6-bit service class tagging in the IP header, which meets the requirement.

b. Any component that supports Real Time traffic and data shall be capable of tagging all Real Time traffic with an Institute of Electrical and Electronics Engineers (IEEE) 802.1Q 2-byte Tag Control Information (TGI) field 12-bit virtual LAN (VLAN) Identification (VID). The VoIP SUT solution supports Real Time traffic. The SUT properly tagged Real Time traffic when converged with data for shared access at the IP Phones.

10. In accordance with the UCR, appendix 3, section A3.2.9.2, the VoIP system end user devices shall meet the following requirements:

a. All end instrument components shall be capable of implementing Service Class tagging (0-63) using the 6-bit DSCPs field in the IP header. The SUT end instruments used 6-bit service class tagging in the IP header, which meets the requirement. The SUT end instrument has the capability to be assigned any DSCP value of 0-63 which meets this requirement.

b. The DSCPs shall be assigned to any distinct service class that originates or traverses the end instrument. In accordance with the UCR the DSCPs may be assigned by either having the end instrument itself assign the DSCP to the distinct service class or having the call control portion of the VoIP system tell the end instrument what DSCP to insert to the distinct service class. The SUT can assign the appropriate DSCP value (0-63) at either the end instrument or the call control portion of the system which meets this requirement.

c. Any end instrument that supports Real Time traffic and data (e.g. shared access) shall be capable of tagging all Real Time traffic with an IEEE 802.1Q 2-byte TCI field 12-bit VID. The SUT end instruments have the capability of supporting shared access. Additionally the SUT end instruments have the capability to tag Real Time Traffic with the appropriate 12 bit VID value from 0 to 4095 which meets this requirement. The SUT end instruments that met all the critical interoperability requirements were the 4621SW, 4625SW, 9620, 9630, and 9640. These end instruments are certified for 10/100 Mbps shared access (i.e., same switch port is shared by PC and IP phone).

11. In accordance with the UCR, appendix 3, section A3.2.10, the VoIP system shall meet the maximum downtime of 80 minutes per year for the system

and 120 minutes per year for the subscriber. This requirement was met and verified via a LoC.

(b) Scalability. The Avaya S8300 can support a maximum of 64 IP subscribers. The recommendation is to consult an engineer to determine the appropriate configurations. The SUT is certified with any certified ASLAN on the UC APL. The ASLAN can be scaled to meet the maximum subscribers as long as it is comprised of the equipment and software listed in this certification, and meets the traffic engineering constraints contained in the UCR, appendix 3.

(5) Network Gateways. The SUT met all critical interoperability certification requirements for the Public Switched Telephone Network (PSTN) Network Gateways. The interfaces certified for the PSTN are T1 CAS with DTMF, DP, and MFR1 signaling; E1 CAS with DTMF, DP, and MFR1 signaling; and T1 ISDN PRI NI 1/2 ANSI T1 607.

b. System Interoperability Results. The SUT is certified for joint use in the DSN as a PBX 1 and PBX 2 in accordance with the requirements set forth in the UCR. The interoperability test summary is shown in Table 2-3. The SUT Interoperability Requirements/Status is shown in Table 2-4.

Table 2-3. SUT Interoperability Test Summary

DSN Trunk Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all critical CRs and FRs with the following minor exception: Wink start recognition is not within the required tolerance.[1]
E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs with the following minor exception: Wink start recognition is not within the required tolerance.[1]
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Met all critical CRs and FRs.
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested	This interface is not supported by the SUT. This is not a required interface for a PBX 1. There is no risk associated with the SUT not supporting this feature.
DSN Line Interfaces			
Interface & Signaling	**Critical**	**Status**	**Remarks**
2-Wire Analog (GR-506-CORE)	Yes	Certified	Met all critical CRs and FRs with the following minor exception: Precedence ring cadence not in accordance with UCR requirement.[2]
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Met all critical CRs and FRs with the following minor exception: Precedence ring cadence not in accordance with UCR requirement.[2]
2-Wire Proprietary Digital	No	Certified	Met all critical CRs and FRs with the following minor exception: Precedence ring cadence not in accordance with UCR requirement.[2]
VoIP	No	Certified	Met all critical CRs and FRs with the following minor exception: Precedence ring cadence not in accordance with UCR requirement.[2]
DSN Features and Capabilities			
Features and Capabilities	**Critical**	**Status**	**Remarks**
Common Features	Yes	Certified	Met all critical CRs and FRs with the following minor exceptions: The call pick-up feature does not pick-up the call with the highest precedence or longest ringing call first.[3] Three-way conference members do not maintain their assigned precedence levels.[4]
Attendant	No	Not Tested	This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.
Public Safety	Yes	Certified	The SUT met all critical CRs and FRs for Basic 911. Additionally the SUT met the following non-critical CRs and FRs: Tracing of a Terminating Call, Outgoing Call Tracing, and Trace of a Call in Progress.
Preset Conferencing	No	Not Tested	This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.
Meet-me Conferencing	Yes	Not Tested	This feature is not supported by the SUT. This is a new UCR requirement and the vendor has until June 2009 to develop this capability.
Progressive Conferencing	No	Certified	Met all CRs and FRs for Progressive Conferencing with the following minor exception: Progressive Conference members do not maintain their assigned precedence level for each leg of the conference.[5]
Nailed-up Connections	No	Not Tested	This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.
DSN Hotline Services	No	Not Certified	The SUT offers this feature however; it does not fully meet all the CRs and FRs for Hotline Services.[6] This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.
MLPP	Yes	Certified	Met all critical CRs and FRs.
Call Processing	Yes	Certified	Met all critical CRs and FRs.
ISDN Services	Yes	Certified	Met all critical CRs and FRs.
Synchronization	Yes	Certified	Met all critical CRs and FRs.
Reliability	Yes	Certified	Met all critical CRs and FRs.
Security	Yes	Certified	See note 7.
VoIP System	No	Certified	The SUT is certified for VoIP specifically with any certified ASLAN posted on the UC APL. The SUT did not meet the IPv6 capability requirement to be compliant no later than 31 December 2008.[8]

Table 2-3. SUT Interoperability Test Summary (continued)

Network Gateways				
Gateway	**Interface & Signaling**	**Critical**	**Status**	**Remarks**
PSTN	T1 CAS (DTMF, MFR1, DP)	No	Certified	Met all critical CRs and FRs with the following minor exception: Wink start recognition is not within the required tolerance.[1]
	E1 CAS (DTMF, MFR1, DP)	No (Europe only)	Certified	Met all critical CRs and FRs with the following minor exception: Wink start recognition is not within the required tolerance.[1]
	T1 ISDN PRI NI 1/2 (ANSI T1.607)	No	Certified	Met all critical CRs and FRs.
	E1 ISDN PRI (ITU-T Q.931)	No (Europe only)	Not Tested	This interface is not supported by the SUT. This is not a required interface for a PBX 1. There is no risk associated with the SUT not supporting this feature.

NOTES:

1 T1 and E1 CAS wink start recognition is not within the required tolerance of 100 ms to 350 ms. The SUT recognizes a wink start signal from 100 ms to 390 ms over a T1 CAS interface and 100 ms to 395 ms over an E1 CAS interface. Since all switches certified with T1 and/or E1 CAS are required to generate a wink start signal from 140-290 ms, this discrepancy has no operational impact on call processing.

2 The SUT precedence above ROUTINE ring cadence is not within the specification stipulated in the UCR. Since the precedence above ROUTINE ring cadence is distinguished from the ROUTINE ring cadence, there is no operational impact.

3 The SUT call pickup feature doesn't retrieve the call with the highest precedence first. The SUT retrieves unanswered call pickup group calls above ROUTINE in a random sequence. The UCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to either the attendant, night service, or alternate DN. The operational impact is minor.

4 Three-way conference members do not maintain their assigned precedence levels. Since the SUT classmarks the conference members at the highest precedence level, the operational impact is minor.

5 Progressive conference members do not maintain their assigned precedence levels for each respective leg of the conference. Since the SUT classmarks all conference members at the highest precedence level, the operational impact is minor.

6 This feature is supported by SUT. However it does not support ISDN PRI Codeset 5 off Hook Indicator Information Elements for Hotline. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.

7 Security is tested by DISA-led Information Assurance test teams and published in a separate report, reference (c).

8 An IPv6 capable system or product, as defined in the UCR, paragraph 1.7, shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of IPv4. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of the company. The vendor stated, in writing, compliance to the following criteria with one exception; the vendor stated in their LoC that the G350 will not be IPv6 compliant. OSD waived this requirement for the G350 on 19 November 2008.
   a. Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).
   b. Maintaining interoperability in heterogeneous environments and with IPv4.
   c. Commitment to upgrade as the IPv6 standard evolves.
   d. Availability of contractor/vendor IPv6 technical support.

Table 2-3. SUT Interoperability Test Summary (continued)

LEGEND:

ANSI	American National Standards Institute	Mbps	Megabits per second
APL	Approved Products List	MFR1	Multi-Frequency Recommendation 1
ASLAN	Assured Services Local Area Network	MLPP	Multi-Level Precedence and Preemption
BRI	Basic Rate Interface	ms	milliseconds
CAS	Channel Associated Signaling	NI 1/2	National ISDN Standard 1 or 2
CRs	Capability Requirements	OSD	Office of the Secretary of Defense
DISA	Defense Information Systems Agency	PBX 1	Private Branch Exchange 1
DN	Directory Number	PRI	Primary Rate Interface
DP	Dial Pulse	PSTN	Public Switched Telephone Network
DSN	Defense Switched Network	Q.931	Signaling Standard for ISDN
DSS1	Digital Subscriber Signaling 1	Q.955.3	ISDN Signaling standard for E1 MLPP
DTMF	Dual Tone Multi-Frequency	SS7	Signaling System 7
E1	European Basic Multiplex Rate (2.048 Mbps)	SUT	System Under Test
FRs	Feature Requirements	T1	Digital Transmission Link Level 1 (1.544 Mbps)
GR	Generic Requirement	T1.607	ISDN Layer 3 Signaling Specification for Circuit Switched Bearer Service for DSS1
GR-506-CORE	LSSGR: Signaling for Analog Interfaces		
IPv4	Internet Protocol version 4	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
IPv6	Internet Protocol version 6	UC	Unified Capabilities
ISDN	Integrated Services Digital Network	UCR	Unified Capabilities Requirements
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector	VoIP	Voice over Internet Protocol
LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements		

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet), or http://199.208.204.125 (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi.

Table 2-4. SUT Interoperability Requirements/Status

DSN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
T1 CAS (MFR1, DTMF, DP)	No	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 2.3.2	Met	
				Line Signaling (R)	UCR Section 5.2	Met	
				Normal Wink Start Operations (C)	UCR Section 5.3.3.1.1	Met	
				Glare Operation (C)	UCR Section 5.3.3.1.2	Met	
				Abnormal Wink Start (C)	UCR Section 5.3.3.2.1	Met	See note 1.
				Glare Resolution (C)	UCR Section 5.3.3.2.2	Met	
				Call for Service Timing (R)	UCR Section 5.3.5	Met	
				Guard Timing (R)	UCR Section 5.3.6	Met	
				Satellite Timing (C)	UCR Section 5.3.7	Met	
				Disconnect Control (C)	UCR Section 5.3.8	Met	
				Reselect and Retrial (C)	UCR Section 5.3.9	Met	
				Off-Hook Supervision Transition (C)	UCR Section 5.3.10	Met	
				Dial-Pulse Signals (C)	UCR Section 5.4.1	Met	
				DTMF Signaling (C)	UCR Section 5.4.2	Met	
				Standard Digit Format for Precedence (C)	UCR Section 5.4.2.1	Met	
				MFR1 2/6 Signaling (C)	UCR Section 5.4.3	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Met	
				Layer 3 DSN User-to-Network Signaling (R)	UCR Section 5.7.1.4	Met	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.7.1.4.2	Met	
				Sequence of Messages for DSN Circuit-Switched Calls (R)	UCR Section 5.7.1.4.3	Met	
				Message Functional Definition and Content (R)	UCR Section 5.7.1.4.4	Met	
				General Message Format and Information Elements Coding (R)	UCR Section 5.7.1.4.5	Met	
				PCM-24 Digital Trunk Interface (R)	UCR Section 7.1	Met	
				Interface Characteristics (R)	UCR Section 7.1.1	Met	
				Supervisory Channel Associated Signaling (C)	UCR Section 7.1.2	Met	
				Clear Channel Capability (R)	UCR Section 7.1.3	Met	
				Alarm and Restoral Requirements (R)	UCR Section 7.1.4	Met	
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 7.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 7.5	Not Tested	See note 2.
				Trunk Group-Remove from Service (C)	UCR Section 2.5.5	Met	
				Trunk Group-Restore to Service (C)	UCR Section 2.5.6	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
T1 CAS (MFR1, DTMF, DP) (continued)	No	Certified	Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				56 kbps switched data (C)	UCR Section 3.10	Met	
				NX56 synchronous BER (C)	UCR Section 3.10	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
E1 CAS (MFR1, DTMF, DP)	No (Europe only)	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 2.3.2	Met	
				Line Signaling (R)	UCR Section 5.2	Met	
				Normal Wink Start Operations (C)	UCR Section 5.3.3.1.1	Met	
				Glare Operation (C)	UCR Section 5.3.3.1.2	Met	
				Wink Start (C)	UCR Section 5.3.3.2.1	Met	See note 1.
				Glare Resolution (C)	UCR Section 5.3.3.2.2	Met	
				Call for Service Timing (R)	UCR Section 5.3.5	Met	
				Guard Timing (R)	UCR Section 5.3.6	Met	
				Satellite Timing (C)	UCR Section 5.3.7	Met	
				Disconnect Control (C)	UCR Section 5.3.8	Met	
				Reselect and Retrial (C)	UCR Section 5.3.9	Met	
				Off-Hook Supervision Transition (C)	UCR Section 5.3.10	Met	
				Dial-Pulse Signals (C)	UCR Section 5.4.1	Met	
				DTMF Signaling (C)	UCR Section 5.4.2	Met	
				Standard Digit Format for Precedence (C)	UCR Section 5.4.2.1	Met	
				MFR1 2/6 Signaling (C)	UCR Section 5.4.3	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Met	
				PCM-30 Digital Trunk Interface (C)	UCR Section 7.2	Met	
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 7.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 7.5	Not Met	See note 2.
				Trunk Group-Remove from Service (C)	UCR Section 2.5.5	Met	
				Trunk Group-Restore to Service (C)	UCR Section 2.5.6	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				56 kbps switched data (C)	UCR Section 3.10	Met	
				64 kbps switched data (C)	UCR Section 3.10	Met	
				NX56 synchronous BER (C)	UCR Section 3.10	Met	
				NX64 synchronous BER (C)	UCR Section 3.10	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
T1 ISDN PRI NI 1/2 (ANSI T1.619a)	Yes	Certified	Trunking	Direct Inward Dialing (C)	UCR Section 2.3.2	Met	
				National ISDN 1/2 Primary Access (R)	UCR Section 2.3.4.1	Met	
				ISDN ANSI MLPP Service Capability (R)	UCR Section 2.3.4.1.1	Met	
				Call for Service Timing (R)	UCR Section 5.3.5	Met	
				Disconnect Control (C)	UCR Section 5.3.8	Met	
				Off-Hook Supervision Transition (C)	UCR Section 5.3.10	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Met	
				DSN ISDN User-to-Network Signaling (R)	UCR Section 5.7.1	Met	
				Application (R)	UCR Section 5.7.1.1	Met	
				Physical Layer (R)	UCR Section 5.7.1.2	Met	
				Data Link Layer (R)	UCR Section 5.7.1.3	Met	
				Data Link Connection (R)	UCR Section 5.7.1.3.1	Met	
				Peer-to-Peer Procedures of Data-Link Layer (R)	UCR Section 5.7.1.3.2	Met	
				Layer 3 DSN User-to-Network Signaling (R)	UCR Section 5.7.1.4	Met	
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.7.1.4.2	Met	
				Sequence of Messages for DSN Circuit-Switched Calls (R)	UCR Section 5.7.1.4.3	Met	
				Message Functional Definition and Content (R)	UCR Section 5.7.1.4.4	Met	
				General Message Format and Information Elements Coding (R)	UCR Section 5.7.1.4.5	Met	
				Supplementary Services (C)	UCR Section 5.7.1.4.6	Not Tested	See note 3.
				PCM-24 Digital Trunk Interface (R)	UCR Section 7.1	Met	
				Interface Characteristics (R)	UCR Section 7.1.1	Met	
				Clear Channel Capability (R)	UCR Section 7.1.3	Met	
				Alarm and Restoral Requirements (R)	UCR Section 7.1.4	Met	
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 7.3	Met	
				Integrated Digital Loop Carrier (C)	UCR Section 7.5	Met	
				Trunk Group-Remove from Service (C)	UCR Section 2.5.5	Met	
				Trunk Group-Restore to Service (C)	UCR Section 2.5.6	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
T1 ISDN PRI NI 1/2 (ANSI T1.619a) (continued)	Yes	Certified	Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				56 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				64 kbps switched data (R: PRI only)	UCR Section 3.10	Met	
				NX56 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				NX64 synchronous BER (R: PRI only)	UCR Section 3.10	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
			VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
E1 ISDN PRI (ITU-T Q.955.3)	No (Europe only)	Not Tested (See note 2.)	Trunking	Direct Inward Dialing (C)	UCR Section 2.3.2	Not Tested	See note 2.
				ITU-T ISDN Primary Access (C)	UCR Section 2.3.4.2	Not Tested	See note 2.
				ITU-T ISDN Primary Access Digital Subscriber Signaling System Number 1 MLPP (C)	UCR Section 2.3.4.2.1	Not Tested	See note 2.
				Call for Service Timing (R)	UCR Section 5.3.5	Not Tested	See note 2.
				Disconnect Control (C)	UCR Section 5.3.8	Not Tested	See note 2.
				Off-Hook Supervision Transition (C)	UCR Section 5.3.10	Not Tested	See note 2.
				DSN ISDN User-to-Network Signaling (R)	UCR Section 5.7.1	Not Tested	See note 2.
				Application (R)	UCR Section 5.7.1.1	Not Tested	See note 2.
				Physical Layer (R)	UCR Section 5.7.1.2	Not Tested	See note 2.
				Data Link Layer (R)	UCR Section 5.7.1.3	Not Tested	See note 2.
				Data Link Connection (R)	UCR Section 5.7.1.3.1	Not Tested	See note 2.
				Peer-to-Peer Procedures of Data-Link Layer (R)	UCR Section 5.7.1.3.2	Not Tested	See note 2.
				Layer 3 DSN User-to-Network Signaling (R)	UCR Section 5.7.1.4	Not Tested	See note 2.
				DSN User-to-Network Signaling for Circuit-Switched Bearer Services (R)	UCR Section 5.7.1.4.2	Not Tested	See note 2.
				Sequence of Messages for DSN Circuit-Switched Calls (R)	UCR Section 5.7.1.4.3	Not Tested	See note 2.
				Message Functional Definition and Content (R)	UCR Section 5.7.1.4.4	Not Tested	See note 2.
				General Message Format and Information Elements Coding (R)	UCR Section 5.7.1.4.5	Not Tested	See note 2.
				Supplementary Services (C)	UCR Section 5.7.1.4.6	Not Tested	See note 2.
				PCM-30 Digital Trunk Interface (C)	UCR Section 7.2	Not Tested	See note 2.
				Interoperation of PCM-24 and PCM-30 (C)	UCR Section 7.3	Not Tested	See note 2.
				Integrated Digital Loop Carrier (C)	UCR Section 7.5	Not Tested	See note 2.
				Trunk Group-Remove from Service (C)	UCR Section 2.5.5	Not Tested	See note 2.
				Trunk Group-Restore to Service (C)	UCR Section 2.5.6	Not Tested	See note 2.
			Voice	MOS (R)	CJCSI 6215.01C	Not Tested	See note 2.
				Secure calls (R)	CJCSI 6215.01C	Not Tested	See note 2.

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Trunk Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
E1 ISDN PRI (ITU-T Q.955.3) (continued)	No (Europe only)	Not Tested (See note 2.)	Facsimile	Analog: ITU-T T.4 (R)	DISR	Not Tested	See note 2.
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Not Tested	See note 2.
				56 kbps switched data (R: PRI only)	UCR Section 3.10	Not Tested	See note 2.
				64 kbps switched data (R: PRI only)	UCR Section 3.10	Not Tested	See note 2.
				NX56 synchronous BER (R: PRI only)	UCR Section 3.10	Not Tested	See note 2.
				NX64 synchronous BER (R: PRI only)	UCR Section 3.10	Not Tested	See note 2.
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Not Tested	See note 2.
			VTC	ITU-T H.320 (R: PRI only)	FTR 1080B-2002	Not Tested	See note 2.

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Line Interfaces							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
2-Wire Analog	Yes	Certified	Access	Directory Number Identification (R)	UCR Section 2.1.1	Met	
				PBX Line (C)	UCR Section 2.3.1	Met	
				Analog Line (R)	UCR Section 2.3.5	Met	
				Basic Line Test Capabilities (R)	UCR Section 2.5.4.1.1	Met	
				Advanced Line Test Capabilities (C)	UCR Section 2.5.4.1.2	Not Tested	See note 3
				Loop Start Line (R: 2-Wire Analog only)	UCR Section 5.2.1	Met	
				Reverse Battery (R)	UCR Section 5.3.1	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Met	See note 4.
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
ISDN BRI NI 1/2 (ANSI T1.619a)	No	Certified	Access	Directory Number Identification (R)	UCR Section 2.1.1	Met	
				National ISDN 1/2 Basic Access (C)	UCR Section 2.3.3	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Met	See note 4
				S/T Reference Point (R)	UCR Section 5.7.1.2.1	Met	
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	
			Facsimile	Analog: ITU-T T.4 (R)	DISR	Met	
			Data	Modem (VBD) (R)	CJCSI 6215.01C	Met	
				Secure data (STE/STU-III) (R)	CJCSI 6215.01C	Met	
			VTC	ITU-T H.320 (R: BRI only)	FTR 1080B-2002	Met	
2-Wire Proprietary Digital	No	Certified	Access	Directory Number Identification (R)	UCR Section 2.1.1	Met	
				Alerting Signals and Tones (R)	UCR Section 5.5	Met	See note 4
			Voice	MOS (R)	CJCSI 6215.01C	Met	
				Secure calls (R)	CJCSI 6215.01C	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Features and Capabilities						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
Common Features	Yes	Certified	Individual Lines (R)	UCR Section 2.1	Met	
			Denied originating service (C)	UCR Section 2.1.3	Met	See note 3.
			Code restriction and diversion (C)	UCR Section 2.1.4	Met	
			Call waiting (R)	UCR Section 2.1.5	Met	
			Three-way calling (R)	UCR Section 2.1.6	Met	See note 5.
			Add-on transfer, conference calling, and call hold (C)	UCR Section 2.1.7	Met	See note 5.
			Call Transfer Individual – All calls (R)	UCR Section 2.1.7.1	Met	
			Call Transfer - Internal Only (R)	UCR Section 2.1.7.2	Met	
			Call Transfer – Individual – Incoming Only/Add-On Consultation Hold – Incoming Call (R)	UCR Section 2.1.7.3	Met	
			Call Transfer – Outside (R)	UCR Section 2.1.7.4	Met	
			Call Transfer – Add-On Restricted Station (C)	UCR Section 2.1.7.5	Not Tested	See note 3.
			Call Transfer – Attendant (C)	UCR Section 2.1.7.6	Not Tested	See note 3.
			Call Hold (R)	UCR Section 2.1.7.7	Met	
			Conference Calling – Six Way Station Controlled (C)	UCR Section 2.1.7.8	Met	See note 7.
			Call forwarding Variable (R)	UCR Section 2.1.8.1	Met	
			Call Forward Busy Line (R)	UCR Section 2.1.8.2	Met	
			Call Forwarding – Don't Answer – All Calls (R)	UCR Section 2.1.8.3	Met	
			Selective Call Forwarding (C)	UCR Section 2.1.8.4	Met	See note 3.
			Call pick-up (C)	UCR Section 2.1.9	Met	See note 6.
			Address Translation (C)	UCR Section 2.7	Met	
			Assured Dial Tone (C)	UCR Section 2.9	Met	
Attendant	No	Not Tested	Attendant Features (C)	UCR Section 2.2	Not Tested	See note 3
Public Safety	Yes	Certified	Emergency Service (911) Caller (R)	UCR Section 2.4.1.1	Met	
			Emergency Service (911) Public Safety Answering Service (C)	UCR Section 2.4.1.2	Not Tested	See note 3.
			Enhanced Emergency Service (E911) (C)	UCR Section 2.4.1.3	Not Tested	See note 3.
			Trace of terminating calls (C)	UCR Section 2.4.2	Met	
			Outgoing call trace (C)	UCR Section 2.4.3	Met	
			Trace of a call in progress (C)	UCR Section 2.4.5	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Features and Capabilities						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
Conferencing	Yes	Not Certified	Preset Conferencing (C)	UCR Section 2.6	Not Tested	See note 3.
			Meet-Me Conferencing (R)	UCR Section 2.6.2	Not Tested	See note 7.
			Progressive Conferencing (C)	UCR Section 2.6.3	Met	See note 7.
Nailed-up Connections	No	Not Tested	Nailed-Up Connections (C)	UCR Section 2.8	Not Tested	See note 3.
DSN Hotline Services	No	Not Certified	DSN Analog Hotline Service (C)	UCR Section 2.12	Not Met	See note 8.
MLPP	Yes	Certified	MLPP Overview (R)	UCR Section 3.1	Met	
			Preemption in the Network (R)	UCR Section 3.2	Met	
			Network Facility with Lower Precedence Calls (R)	UCR Section 3.2.1	Met	
			Network Facility with Equal or Higher Precedence Calls (R)	UCR Section 3.2.2	Met	
			Precedence Call Diversion (R)	UCR Section 3.3	Met	
			Channel Associated Signaling (C)	UCR Section 3.4.1	Met	
			Primary Rate Interface (R)	UCR Section 3.4.2	Met	
			Analog Line MLPP (R)	UCR Section 3.5	Met	
			ISDN MLPP Basic Rate Interface (C)	UCR Section 3.6	Met	
			ISDN Primary Rate Interface (R)	UCR Section 3.7	Met	
			Precedence Call Waiting (R)	UCR Section 3.8.1	Met	
			Call Forwarding (R)	UCR Section 3.8.2	Met	
			Call Transfer (R)	UCR Section 3.8.3	Met	
			Call Hold (R)	UCR Section 3.8.4	Met	
			Three-Way Calling (R)	UCR Section 3.8.5	Met	See note 5.
			Call Pickup (C)	UCR Section 3.8.6	Met	See note 6.
			Conferencing (C)	UCR Section 3.8.7	Met	See note 7.
			Multiline Hunt Group (C)	UCR Section 3.8.8	Met	
			Community of Interest (C)	UCR Section 3.8.9	Not Tested	See note 2.
			MLPP Interaction with EKTS features (C)	UCR Section 3.11	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Features and Capabilities						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
Call Processing	Yes	Certified	Call Treatments (R)	UCR Section 4.1	Met	
			Primary and Alternate Routing (C)	UCR Section 4.2	Met	
			E&M Lead Signaling States (C)	UCR Section 4.3.1	Not Tested	See note 2.
			4-Wire Analog User Access Lines (C)	UCR Section 4.3.2	Not Tested	See note 2.
			2-Wire User Access Lines (R)	UCR Section 4.3.3	Met	
			Termination of Analog Lines (R)	UCR Section 4.3.4	Met	
			DSN User Dialing (R)	UCR Section 4.5.1.1	Met	
			Interswitch and Intraswitch Dialing (R)	UCR Section 4.5.1.2	Met	
			Seven-Digit Dialing (R)	UCR Section 4.5.1.2.1	Met	
			Ten-Digit Dialing (R)	UCR Section 4.5.1.2.2	Met	
			Access Code (R)	UCR Section 4.5.1.3	Met	
			Access Digit (R)	UCR Section 4.5.1.3.1	Met	
			Precedence Digit (R)	UCR Section 4.5.1.3.2	Met	
			Service Digit (R)	UCR Section 4.5.1.3.3	Met	
			Route Code (R)	UCR Section 4.5.1.4	Met	
			Area Code (R)	UCR Section 4.5.1.5	Met	
			Switch Code (R)	UCR Section 4.5.1.6	Met	
			Line Number (R)	UCR Section 4.5.1.7	Met	
			Calling Name Delivery (C)	UCR Section 4.5.1.8.1	Not Tested	See note 2.
			Calling Number Delivery (R)	UCR Section 4.5.1.8.2	Met	
			Emergency Service 911 Conflict Resolution (R)	UCR Section 4.5.1.9	Met	
			DSN Switch Outpulsing Digit Formats (C)	UCR Section 4.5.2	Met	
			Standard Directory Number (R)	UCR Section 4.5.3	Met	
			Standard Test Numbers (C)	UCR Section 4.5.4	Not Tested	See note 2.
			Base Services – Abbreviated Numbers (C)	UCR Section 4.5.5	Not Tested	See note 2.
			Digit Reception Requirements (R)	UCR Section 4.5.6	Met	
			Screening (C)	UCR Section 4.5.8	Met	
ISDN Services	Yes	Not Tested	BRI Access, Call Control and Signaling (C)	UCR Section 10, Table 10-1	Met	
			Uniform Interface Configuration for BRIs (C)	UCR Section 10, Table 10-2	Met	
			Electronic Key Telephone Systems (EKTS) (C)	UCR Section 10, Table 10-3	Met	
			PRI Access, Call Control and Signaling (R)	UCR Section 10, Table 10-4	Met	
			PRI Features (R)	UCR Section 10, Table 10-5	Met	
			Packet Data Features and Capabilities (C)	UCR Section 10, Table 10-6	Not Tested	See note 3.

Table 2-4. SUT Interoperability Requirements/Status (continued)

DSN Features and Capabilities						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
Synchroniz-ation	Yes	Certified	Line timing mode (R)	UCR Section 11.1.1.2	Met	
			Internal Stratum 4 (R)	UCR Section 11.1.2.2	Met	
			Synchronization Performance Monitoring Criteria (C)	UCR Section 11.2	Met	
			DS1 Traffic Interfaces (C)	UCR Section 11.3	Not Tested	See note 3.
			DS0 Traffic Interconnects (C)	UCR Section 11.4	Not Tested	See note 3.
Reliability	Yes	Certified	System Availability (R)	UCR Section 12.2	Met	
			Backup Power (R)	UCR Section 12.3	Not Tested	See note 9.
			Power Components (R)	UCR Section 12.3.1	Not Tested	See note 9.
			UPS Requirements (R)	UCR Section 12.3.2	Not Tested	See note 9.
			UPS PBX 1 Load Capacity (R)	UCR Section 12.3.2.2	Not Tested	See note 9.
			Backup Power (Environmental) (R)	UCR Section 12.3.3	Not Tested	See note 9.
			Alarms (R)	UCR Section 12.3.4	Not Tested	See note 9.
Security	Yes	Certified	GR-815, STIGs, and DoDI 8510.bb (DIACAP) (R)	UCR Section 13	Met	See note 10.
VoIP						
Feature/ Capability	**Critical**	**Feature Status**	**UCR Requirement**	**Reference**	**Test Results**	**Remarks**
VoIP System	Yes	Certified	Voice Quality with MOS of 4.0 or better (R)	UCR App. 3, para. A3.2.1	Met	
			ITU-T G.711 PCM CODEC (R)	UCR App. 3, para. A3.2.2	Met	
			MLPP (R)	UCR App. 3, para. A3.2.3	Met	
			Security (R)	UCR App. 3, para. A3.2.4	Met	
			Network management (C)	UCR App. 3, para. A3.2.5	Met	
			System timing (R)	UCR App. 3, para. A3.2.6	Met	
			Latency ≤ 60 milliseconds (R)	UCR App. 3, para. A3.2.7	Met	
			IPv6 capable (R)	UCR App. 3, para. A3.2.8	Not Met	See note 11.
			Service Class Tagging (R)	UCR App. 3, para. A3.2.9	Met	
			VoIP System Downtime (IP network 80 min/yr Subscriber 20 min/yr)	UCR App. 3, para. A3.2.10	Met	

Table 2-4. SUT Interoperability Requirements/Status (continued)

Network Gateways							
Interface	**Critical**	**Interface Status**	**UCR Requirement**		**Reference**	**Test Results**	**Remarks**
PSTN (See note 12.)	No	Certified	Trunking	Positive Identification Control (C)	CJCSI 6215.01C	Met	
				On-Netting (C)	CJCSI 6215.01C	Met	
				Off-Netting (C)	CJCSI 6215.01C	Met	
				Ground Start Line (R)	UCR Section 5.2.2	Met	
				Immediate Start (C)	UCR Section 5.3.2	Met	
				Delay Dial (C)	UCR Section 5.3.4	Met	

NOTES:

1 T1 and E1 CAS wink start recognition is not within the required tolerance of 100 ms to 350 ms. The SUT recognizes a wink start signal from 100 ms to 390 ms over a T1 CAS interface and 100 ms to 395 ms over an E1 CAS interface. Since all switches certified with T1 and/or E1 CAS are required to generate a wink start signal from 140-290 ms, this discrepancy has no operational impact on call processing.

2 This interface is not supported by the SUT. This is not a required interface for a PBX 1. There is no risk associated with the SUT not supporting this interface.

3 This feature is not supported by the SUT. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.

4 The SUT precedence above ROUTINE ring cadence is not within the specification stipulated in the UCR. Since the precedence above ROUTINE ring cadence is distinguished from the ROUTINE ring cadence, there is no operational impact.

5 Three-way conference members do not maintain their assigned precedence levels. Since the SUT classmarks the conference members at the highest precedence level, the operational impact is minor.

6 The SUT call pickup feature doesn't retrieve the call with the highest precedence first. The SUT retrieves unanswered call pickup group calls above ROUTINE in a random sequence. The UCR requires that "If a call pickup group has more than one party in an unanswered condition and the unanswered parties are at different precedence levels, a call pickup attempt in that group shall retrieve the highest precedence call first." All unanswered precedence calls above ROUTINE in the pickup group do divert after 15-45 seconds if unanswered and are positively connected to either the attendant, night service, or alternate DN. The operational impact is minor.

7 Progressive conference members do not maintain their assigned precedence levels for each respective leg of the conference. Since the SUT classmarks all conference members at the highest precedence level, the operational impact is minor. Meet-me conferencing is not supported by the SUT. This is a new UCR requirement and the vendor has 18 months (until July 2009) to develop this capability.

8 This feature is supported by SUT. However it does not support ISDN PRI Codeset 5 off Hook Indicator Information Elements for Hotline. This is not a required feature for a PBX 1. There is no risk associated with the SUT not supporting this feature.

9 This requirement is a non-testable requirement. It is the responsibility of the respective base/post/camp/station communications agency to provide this with the SUT when installed.

10 Security is tested by DISA-led Information Assurance test teams and published in a separate report, reference (c).

11 An IPv6 capable system or product, as defined in the UCR, paragraph 1.7, shall be capable of receiving, processing, and forwarding IPv6 packets and/or interfacing with other systems and protocols in a manner similar to that of IPv4. IPv6 capability is currently satisfied by a vendor Letter of Compliance signed by the Vice President of the company. The vendor stated, in writing, compliance to the following criteria with one exception; the vendor stated in their LoC that the SUT will not be IPv6 capability compliant until May of 2009 with their G450 gateway in lieu of the G350 gateway. OSD waived this requirement on 19 November 2008.
   a. Conformant with IPv6 standards profile contained in the Department of Defense Information Technology Standards Registry (DISR).
   b. Maintaining interoperability in heterogeneous environments and with IPv4.
   c. Commitment to upgrade as the IPv6 standard evolves.
   d. Availability of contractor/vendor IPv6 technical support.

12 Voice, facsimile, data, and VTC service requirements for PSTN are identical to DSN with the exception of MLPP.

Table 2-4. SUT Interoperability Requirements/Status (continued)

LEGEND:

ANSI	American National Standards Institute	FTR 1080B-2002	Video Teleconferencing Services	PBX 1	Private Branch Exchange 1
App.	Appendix	G.711	PCM of voice frequencies	PCM	Pulse Code Modulation
BER	Bit Error Ratio	GR	Generic Requirement	PCM-24	Pulse Code Modulation - 24 Channels
BNEA	Busy Not Equipped Announcement	GR-815	Generic Requirements For Network Element/Network System (NE/NS) Security	PCM-30	Pulse Code Modulation - 30 Channels
BPA	Blocked Precedence Announcement			PMO	Program Management Office
BRI	Basic Rate Interface	H.320	Standard for Narrowband VTC	PNT	Preemption Notification Tone
C	Conditional	ICA	Isolated Code Announcement	PRI	Primary Rate Interface
CAS	Channel Associated Signaling	IP	Internet Protocol	PSTN	Public Switched Telephone Network
CJCSI	Chairman of the Joint Chiefs of Staff Instruction	IPv4	Internet Protocol version 4	Q.955.3	ISDN Signaling Standard for E1 MLPP
		IPv6	Internet Protocol version 6	R	Required
CODEC	Coder/Decoder	ISDN	Integrated Services Digital Network	SS7	Signaling System 7
DIACAP	DoD Information Assurance Certification and Accreditation Process	IT	Information Technology	STE	Secure Terminal Equipment
		ITU-T	International Telecommunication Union-Telecommunication Standardization Sector	STIGs	Security Technical Implementation Guides
DISA	Defense Information Systems Agency			STU-III	Secure Telephone Unit -3rd generation
DISR	DoD IT Standards Registry	JITC	Joint Interoperability Test Command	SUT	System Under Test
DoD	Department of Defense	kbps	kilobits per second	T1	Digital Transmission Link Level 1 (1.544 Mbps)
DoDI	Department of Defense Instruction	Mbps	Megabits per second		
DP	Dial Pulse	MFR1	Multi-Frequency Recommendation 1	T1.619a	SS7 and ISDN MLPP Signaling Standard for T1
DS0	Digital Signal Level 0 (64 kbps)	min	minute		
DS1	Digital Signal Level 1 (1.544 Mbps) (2.048 Mbps European)	MLPP	Multi-Level Precedence and Preemption	T.4	Standardization of Group 3 facsimile terminals for document transmission
		MOS	Mean Opinion Score		
DSN	Defense Switched Network	ms	millisecond	TDM	Time Division Multiplexing
DTMF	Dual Tone Multi-Frequency	NFAS	Non Facility Associated Signaling	UCR	Unified Capabilities Requirements
E&M	Ear and Mouth	NI 1/2	National ISDN Standard 1 or 2	UPS	Uninterruptible Power Supply
E1	European Basic Multiplex Rate (2.048 Mbps)	NX56	Data format restricted to multiples of 56 kbps	VBD	Variable bit data
EKTS	Electronic Key Telephone System	NX64	Data format restricted to multiples of 64 kbps	VoIP	Voice over Internet Protocol
FTR	Federal Telecommunications Recommendation	para.	paragraph	VTC	Video Teleconferencing
		PBX	Private Branch Exchange	yr	year